MOTT MACDONALD

Pelit Wind Power Plant (WPP) Project

Environmental and Social Impact Assessment

July 2025

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Environmental and Social Impact Assessment

July 2025

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Glossary

AFAD	Disaster and Emergency Management Authority
AGL	Above Ground Level
AoI	Area of Influence
AP	Assessment Point
APCV	Air Pollution Contribution Values
AR	Assessment Report
BEE	Borusan ENBW
CBD	Convention on Biological Diversity
CCKP	World Bank Climate Change Knowledge Portal
CCRA	Climate Change Risk Assessment
CHIA	Cultural Heritage Impact Assessment
CIA	Cumulative Impact Assessment
CLO	Community Liaison Officer
CoC	Code of Conduct
COD	Commercial Operation Deployment
DAI	Direct Affected by the Project
DEM	Digital Elevation Model
DGCONA	Spanish General Directorate for the Conservation of Natural Resources
DSI	State Hydraulic Works
EBRD	European Bank for Reconstruction and Development
EEA	European Environment Agency
EF	Emission Factor
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
ELF	Extremely Low-Frequency
ELT	End-of-Life-Tyres
ELV	end-of-life vehicles
EMEP	European Monitoring and Evaluation Programme
EMR	Electromagnetic Radiation
EMRA	Energy Market Regulatory Authority
END	EU Environmental Noise Directive
EP	Equator Principles
EPAP	Equator Principles Action Plan
EPFI	Equator Principles Financial Institutions

EPRP	Emergency Response Plan
ESDAC	European Soil Data Centre
ESDD	Environmental and Social Due Diligence
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ETL	Energy Transmission Line
EU	European Union
FAO	Food and Agriculture Organization's
FTA	Federal Transit Administration
GBIF	Global Biodiversity Information Facility
GBVH	Gender-Based Violence and Harassment
GHG	Greenhouse Gas
GIS	Geographical Information Systems
GWD	Groundwater Directive
HAWT	Horizontal Axis Wind Turbine
HR	Human Resources
HSE	Health, Safety and Environment
ICAO	International Civil Aviation Organization
ICNIRP	International Commission on Non- Ionizing Radiation Protection
IEA	International Energy Agency
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
ILO	International Labour Organisation
IMS	Integrated Management System
IPCC	Intergovernmental Panel on Climate Change
IS-KUR	Turkish Employment Agency
ISO	International Organisation for Standardisation
ISRIC	International Soil Reference and Information Centre
IUCN	International Union for the Conservation of Nature
L&FS	Life and Fire Safety
LALRP	Land Acquisition & Livelihood Restoration Plan
LTV	Long Term Value
LUC	Land Use Capability
LULC	Land Use and Land Cover
MASW	Multi-channel Analysis of Surface Waves
MBT	Mechanical Biological Treatment

MİT	Presidency of the National Intelligence Organization
MoAF	Ministry of Agriculture and Forestry
MoCT	Ministry of Culture and Tourism
MoENR	Ministry of Energy and Natural Resources
MoEUCC	Ministry of Environment, Urbanization and Climate Change
MoLSS	Ministry of Labour and Social Security
NGO	Non-Governmental Organisation
Nox	Nitrogen Oxides
NTS	Non-Technical Summary
OG	Official Gazette
OHS	Occupational Health and Safety
OHSRA	Occupational Health and Safety Risk Assessment
PAA	Project Affected Area
PAH	Polycyclic Aromatic Hydrocarbons
PAP	Project Affected Person
PAS	Publicly Available Specification
PGA	Peak Ground Acceleration
PID	Public Interest Decision
PLC	Programmable Logic Controller
PPE	Personal Protective Equipment
PPREMP	Pollution Prevention and Resource Efficiency Management Plan
PR	Performance Requirement
PS	Performance Standard
RCAPOI	Regulation on the Control of Air Pollution Originating from Industry
RCIAP	Regulation on Control of Industrial Air Pollution
RENC	Regulation on Environmental Noise Control
REPA	Türkiye Energy Potential Map
SCADA	Supervisory Control and Data Acquisition
SEP	Stakeholder Engagement Plan
Sox	Sulphur Oxidic
SRTM	Shuttle Radar Topography Mission
STV	Short Term Value
SuTP	Syrians Under Temporary Protection
TA	Total Area
TABS	Hazardous Waste Declaration System
TBMM	Turkish Grand National Assembly
TEİAŞ	Turkish Electricity Transmission Corporation

TIA	Technical Interaction Analysis Decisions
TPH	Total Petroleum Hydrocarbons
TUÇEV	Turkish Environmental Protection Foundation
TÜREB	Türkiye Wind Energy Association
TVOC	Total Volatile Organic Compound
UEP	Urgent Expropriation Procedure
UIP	Under International Protection
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
VEC	Valued Environmental and Social Component
VOC	Volatile Organic Carbon
WBG	World Bank Group
WEEE	Waste electrical and electronic equipment
WFD	Water Framework Directive
WLCA	Whole Life Carbon Assessment
WP	Working Period
WPP	Wind Power Plant
WT	Wind Turbine
WTG	Wind Turbine Generators
WWF	Worldwide Fund for Nature
WWTP	Wastewater Treatment Plant
ZVI	Zones of Visibility

1 Introduction

1.1 Background and Objective

Pelit Wind Power Plant (WPP) Project ("the Project") with 14 wind turbines and 80 MWe/MWm total installed power is planned to be implemented by Borusan EnBW Enerji Yatırımları ve Üretim A.Ş. (hereinafter referred to as the "the Project Company", "Borusan EnBW Enerji" or "BEE") in Sivas Province; Gürün District; Kürkçü, Koyunlu, Böğrüdelik, Yılanhöyük, Yenibektaşlı, Çiçekyurt, Kayalar, and Konakpınar Villages. The Project components consist of 14 turbines, a switchyard, an administrative building, Project roads (i.e., access and site roads), as well as an energy transmission line (ETL) as a Project associate facility (please refer to Section 2.3 for details).

The Project is subject to conducting a National Environmental Impact Assessment (EIA) study in regard with the Regulation on Environmental Impact Assessment[1] of Türkiye. According to the Regulation, the Project is covered under Article 41 -Wind power plants- of *Annex-1: List of Projects Subject to Environmental Impact Assessment*. In this sense, a National EIA Report was prepared for the Project by an environmental consultancy company, namely En-Çev (with a competency certificate dated 12 October 2017 and numbered 70). The Final National EIA Report was submitted in May 2018 by En-Çev. Upon submission of the Final National EIA Report to the Ministry of Environment, Urbanization and Climate Change (MoEUCC) General Directorate of Environmental Impact Assessment, Permit and Inspection, The "Environmental Impact Assessment (EIA) Affirmative" decision of the Pelit Wind Power Plant (WPP) Project was obtained from MoEUCC General Directorate of Environment, Urbanization and Climate Change on 28 May 2018 for 40 wind turbines with 80 MWe/MWm total installed power.

After securing the "EIA Affirmative" decision, the number and locations of turbines have undergone a revision, as the number of wind turbines changed from 40 to 20 turbines. According to this change in design, unit power of wind turbines has increased to 4 MW, which were previously 2 MW, therefore total installed power of the WPP remained same. On 11 December 2019, the official decision letter (numbered E-290387) was obtained from the General Directorate, indicating that the change in number and locations of wind turbines did not result in revision of Project's total electrical or mechanical power of 80 MW, and the "EIA Affirmative" decision is also valid for the revised Project.

The "EIA Affirmative" decision (dated 28 May 2018 and numbered 5090) of the Project was obtained by Pelit Yenilenebilir Enerji ve Elektrik Üretim A.Ş., which was a subsidiary of BEE. In 2023, these two companies merged under BEE and the Project is transferred to BEE. Therefore, with the official decision letter of General Directorate of Environment, Urbanization and Climate Change dated 27 October 2023 and numbered E-7769212, EIA Affirmative decision was transferred to BEE from Pelit Yenilenebilir Enerji ve Elektrik Üretim A.Ş.

Since the number of the turbines has been decreased from 20 to 14 and the turbine coordinates have been changed within the same Project area after securing the "EIA Affirmative" decision, MoEUCC will be notified about the final revisions and an approval will be obtained without preparation of a new Project Design Document or EIA Report for final total installed capacity of 80MWm/80Mwe. Notification process is done, and approval obtained in with an official decision letter dated 28.06.2024 and numbered E-48331039-220.01-9596107.

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[1] Published in the Official Gazette Date/No: 29.07.2022/31907

Pelit Enerji has secured the "49-year Electric Power Generation Licence" (Licence No. EÜ/10970-17/05160, dated 12 May 2022) from Energy Market Regulatory Authority (EMRA) for the Pelit WPP with 20 turbines. After transfer of the Project to BEE (the Project Company), the licence with Licence No. EÜ/10970-17/05160 was terminated, and a new Electric Power Generation Licence for 47 years and 8 months was secured from the EMRA by the Project Company on 17 August 2023. The new licence is granted as a continuation of the previous one. As stated in the Electric Power Generation Licence, Pelit WPP was expected to be connected to Kangal WPP and Gürün WPP with 154 kV ETL. However, according to information obtained from the Project Company, the Project will be connected to the R-3 WPP which will be located in the northern side of the Project area, Kayalar Village, Gürün District, Sivas Province. Therefore, The Electric Power Generation Licence will be revised after Technical Interaction Analysis (TIA) approval, due to the change in the ETL connection and installed capacity. According to the information shared by the Project Company, the construction period of the Project will be 13 months as stated in the National EIA Report. The construction of the Project will be initiated in the second quarter of 2024 with the construction of Project roads and is planned to be completed by the fourth quarter of 2024. For detailed Project construction schedule, please refer to Section 2.5.

The ETL Project is subject to conducting a National EIA Study in regard with the Regulation on Environmental Impact Assessment[2] of Türkiye. According to the Regulation, the ETL to be constructed within the scope of the Project is subject to “Environmental Impact Assessment Regulation Annex-2” according to the Final Project Information Document (PID) will be prepared for the ETL project and EIA is not required decision will be obtained for the ETL Project The EIA process of the ETL will be finalized according to final ETL layout.

During the construction phase, Concrete Batching Plants (CBP) will be constructed and operated for only construction period of the Project as temporary facilities. Two CBPs, which have a capacity of 90 m^3/h and a total capacity of 180 m^3/h, will be used for the mixing of cement and other materials that will be used in the production of ready-mix concrete for the turbines.

This document represents the Draft Environmental and Social Impact Assessment (ESIA) Report which has been prepared in line with the requirements of the Performance Standards (PSs) of International Finance Corporation (IFC), Performance Requirements (PRs) of the European Bank for Reconstruction and Development (EBRD), and the Equator Principles IV (EP IV), as well as national environmental and social legislation along with other Applicable Standards as summarized in *Chapter 3: Policy, Legal and Institutional Framework*.

1.2 Project Parties

This Section presents the parties of the Project and the organisational capacity of the Project Company defined for performing the Project.

1.2.1 Project Company

The Project is planned to be implemented by “BEE” or the “Project Company” as a leading private sector energy producer in Türkiye. BEE aims to be the most valuable renewable energy company by providing reliable and clean energy to its customers with operational excellence, showing the highest sensitivity to society and the environment[3]. The total installed capacity of

[2] Published in the Official Gazette Date/No: 29.07.2022/31907

[3] Borusan EnBW (n.d) Vision, Mission and Values. Accessed from https://www.borusanenbw.com.tr/kurumsal/vizyon-misyon-degerlerimiz on 07 February 2024.

the Company's power generation portfolio is approximately 725 MW, of which 91,8% consists of nine wind power plants with a total installed capacity of 666 MW.[4]

1.2.2 Project Lenders

The Project is seeking to be funded by European Bank for Reconstruction and Development (EBRD). The lender is defined as "Project Lender" in this Draft ESIA Report. The Project Lender set requirements to manage potential environmental and social risks, and impacts associated with the project for achieving sustainable outcomes in the financed project as per their commitments for financing a project.

1.2.3 The Consultant

As part of the financing process and achieving the sustainable outcomes with the Project, Mott MacDonald Türkiye ("the Consultant") has been appointed by BEE to undertake an ESIA Study to identify the impacts that are likely to occur due to implementation of construction and operation activities under the Project, and to comply with the requirements set by the Project Lender.

1.2.4 Project Organisational Capacity

The Project Company is organized in a way that allows for clear oversight and collaboration among various specialized teams. The organizational chart serves as a visual representation of this structure. It outlines the technical teams tasked with the Project's execution and identifies key individuals responsible for environmental and social management aspects, such as the Environmental Process Lead Engineer, HR Manager, and Community Liaison Officer (CLO). This chart is essential for delineating the roles and facilitating effective communication across the company.

Figure **1.1** and Figure **1.2** demonstrate the organisational capacity of the Project during the construction and operation phases.

[4] Borusan EnBW (n.d) Wind Power. Accessed from https://www.borusanenbw.com.tr/enerji-santrallerimiz on 06 February 2024.

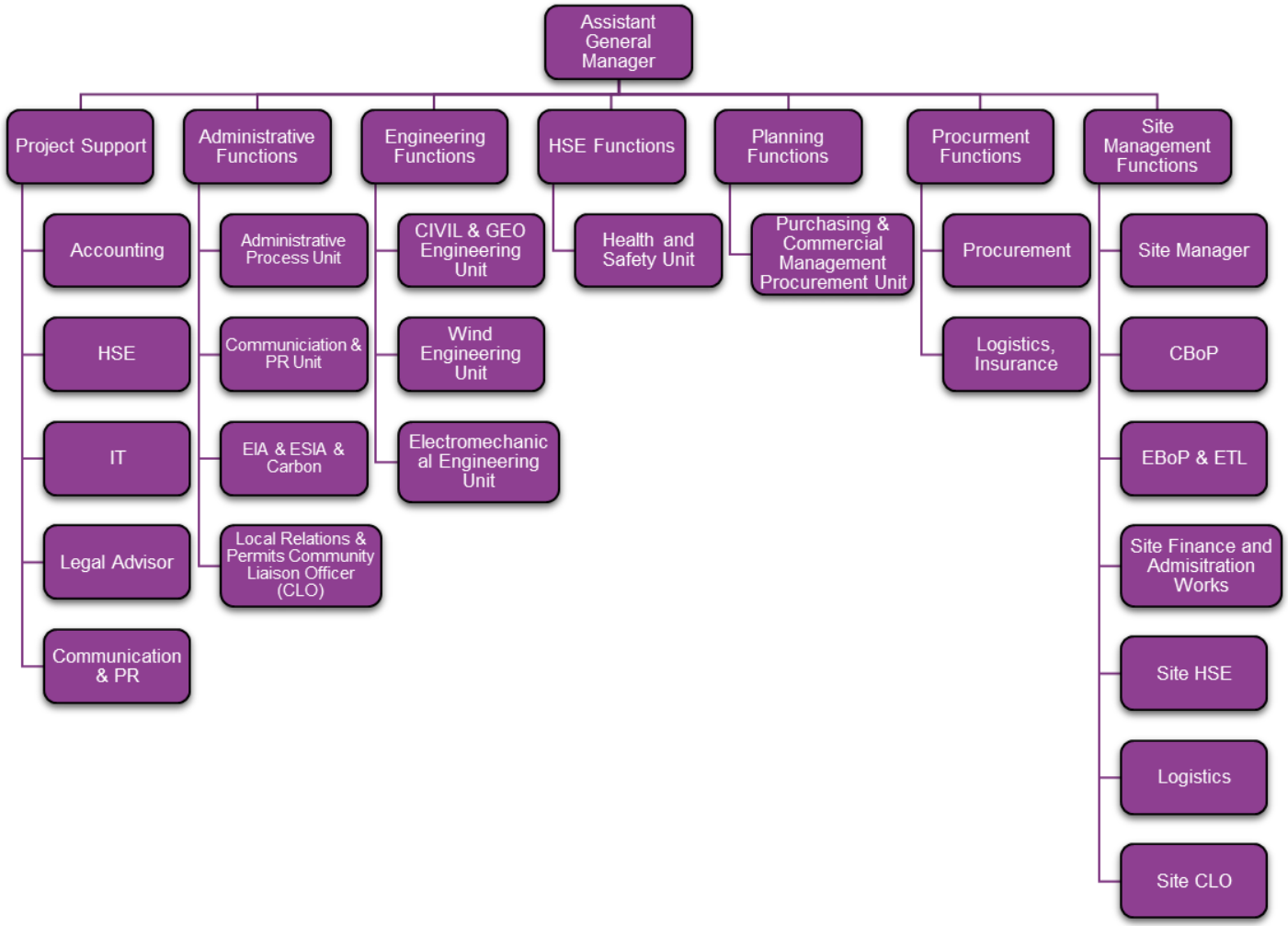


Figure 1.1:Construction Phase Organisational Chart

Source: Provided by the Project Company on 02 April 2024.

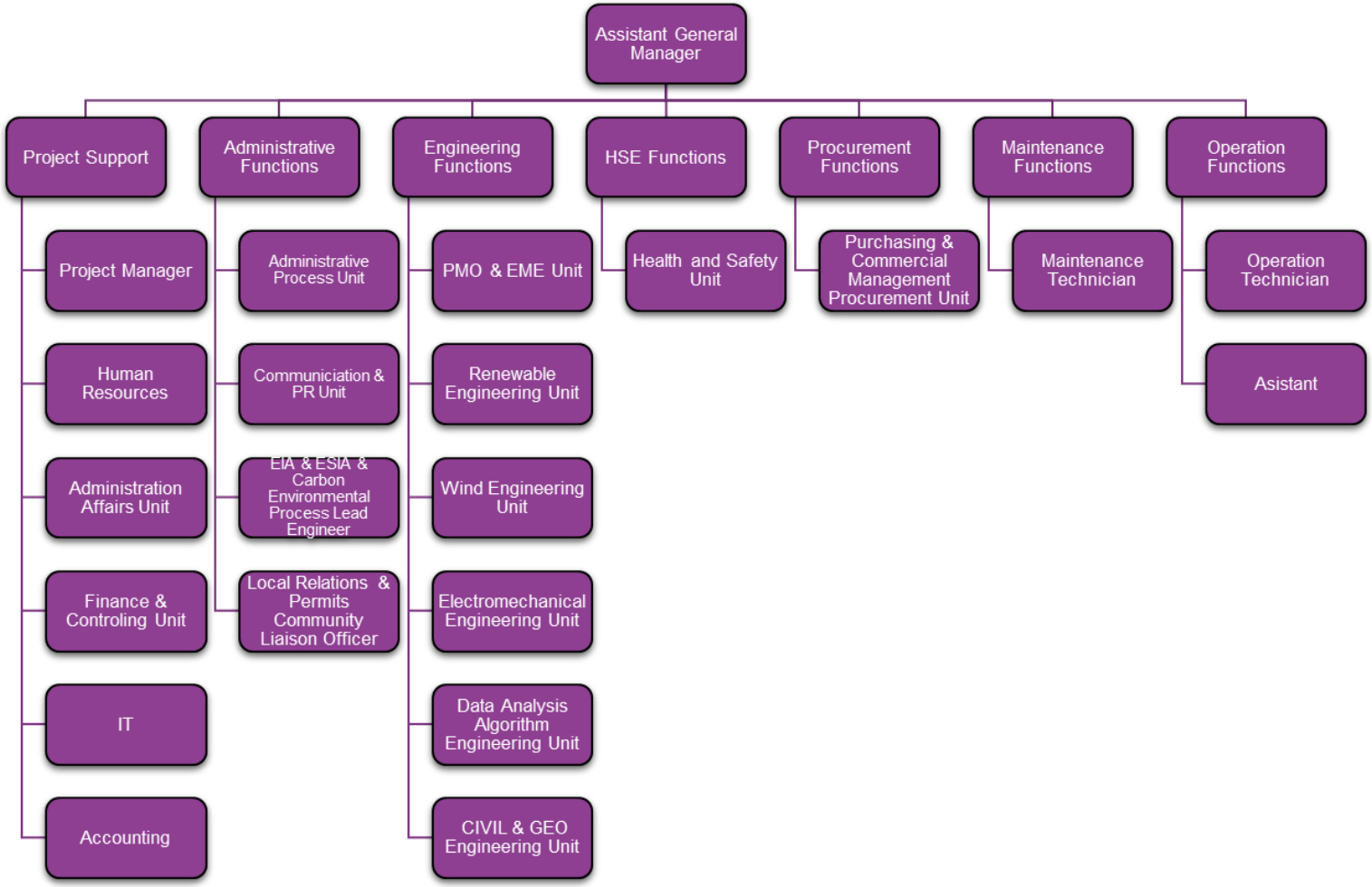


Figure 1.2: Operation Phase Organisational Chart

Source: Provided by the Project Company on 02 April 2024.

1.3 ESIA Scope and Objectives

The outputs of the performed national EIA study were evaluated by the Consultant, and the gaps were analysed in order to assess the Project's compliance with the applicable national and international environmental, health, safety and social standards within the scope of the ESIA Scoping Report prepared by the Consultant in March 2024. The identified gaps outline any additional data that should be collected, and any additional assessments required for the Project to meet the applicable standards within the scope of the ESIA study. The Consultant has carried out required work for collecting additional data and conducting additional assessments required for the Project within the scope of ESIA. The findings, assessment results and evaluation remarks are presented in this Draft ESIA Report, providing the Project's potential impacts as well as the proposed mitigation measures to address these impacts.

Accordingly, the primary objectives of ESIA for the Project are determined as listed below:

- Identification of potential environmental and social impacts that may arise throughout construction and operation phases of the Project,
- Complying with applicable standards which are specified in *Chapter 3: Policy, Legal and Institutional Framework*,
- Engaging with relevant stakeholders including local communities, governmental bodies, non-governmental organisations (NGOs) and other interested parties to gather their perspectives, concerns, and feedback regarding the Project,
- Identification of potential risks associated with the Project activities and proposing mitigation measures to minimize or eliminate adverse impacts on the environment and communities,
- Evaluation of potential impacts of the Project activities on local flora and fauna and proposing measures for protection of biodiversity,
- Assessment of potential impacts of the Project activities on air and water quality, noise levels, emissions, and potential contamination, and proposing measures to mitigate any adverse impacts,
- Evaluation of potential impacts of the Project activities on cultural heritage sites, social structures, and local communities; and proposing measures to preserve cultural and social heritage,
- Evaluation of potential impacts of the Project activities on community health and safety, including the impact of noise and visual effects, and proposing measures to ensure wellbeing of the local communities,
- Assessment of economic and social benefits that the Project may bring to local communities and broader region.

In line with the above-mentioned objectives, the ESIA for the Project aims to ensure that the Project is developed and operated in an environmentally and socially responsible manner, minimising or eliminating adverse impacts and maximizing positive contributions to the surrounding communities and the ecosystem.

1.4 Project Timeline

The tasks undertaken to support the ESIA include baseline data collection, public consultation, and detailed assessment as noted below:

- The detailed design phase of the Project has commenced.
- The National EIA Affirmative decision secured in May 2018.
- ESIA Scoping Report prepared in March 2024.
- Primary ESIA baseline data collection performed from January 2024 to May 2024.

- Draft ESIA Report submitted in June 2024.

1.5 Report Structure

The main ESIA report includes the technical chapters which describes the scope of assessment, the regulatory framework, the assessment methodology, baseline conditions, predicted impacts, proposed mitigation measures, and residual impacts as well as cumulative impacts. Supporting documents, which form a part of the ESIA, are presented in the Appendices. References to the appendix documents are provided in the main text of the ESIA Report, where referred to. The structure and content of this Draft ESIA Report and Appendices are presented in Table 1.1.

The ESIA study is structured as follows:

- Non-Technical Summary (NTS),
- The Draft ESIA Report (this document), including figures and associated appendices, and
- Environmental and Social Management Plan (ESMP)

In addition to the ESIA, the following documents will be prepared for the Project by the Consultant:

- Social Responsibility and Community Development Plan
- Stakeholder Engagement Plan (SEP)
- Land Acquisition & Livelihood Restoration Plan (LALRP)
- Human Rights Impact Assessment.
- Biodiversity Management Plan
- Invasive Species Management Plan
- Traffic Management Plan, and
- Emergency Preparedness and Response Plan.

1.5.1 Non-Technical Summary

The NTS provides a description of the ESIA process and describes the Project and main findings in a way that is easily understood by the general public. This is a standalone document alongside this Draft ESIA Report.

1.5.2 Structure of the ESIA Report

The structure and content of this Draft ESIA Report is shared in Table 1.1.

Table 1.1: Structure of the Draft ESIA Report

Chapter	Title	Description of Content
Chapter 1	Introduction	Presentation of a brief overview and purpose of the ESIA study and this Draft ESIA Report.
Chapter 2	Project Description	Describes the Project, its main components and activities for pre-construction, construction, and operation; as well as the Project alternatives considered in reaching the final design decisions.
Chapter 3	Policy, Legal and Institutional Framework	Defines key national policy and legislation, and international requirements and guidelines applicable to the Project, as well as key national institutions and International Financial Institutions (IFIs).
Chapter 4	ESIA Scope and Methodology	Sets out the stages of the ESIA study, key assumptions and methodologies for undertaking the study.
Chapter 5	Water Quality, Hydrology and Hydrogeology	Presentation of technical assessments undertaken within the ESIA study. Includes a summary of baseline conditions developed by the use of

Chapter	Title	Description of Content
Chapter 6	Land Use, Soil and Geology	quantitative and qualitative primary and secondary data sources and fieldwork, the presentation of potential environmental impacts and suggested mitigation measures. In this context, direct and indirect impacts, temporary and permanent impacts of reversible or irreversible natures are identified, along with the mitigation measures to be implemented in order to reduce the level of resulting effects on the environment. Furthermore, the significance of - residual (post-mitigation) effects is presented.
Chapter 7	Air Quality	
Chapter 8	Climate Change & Greenhouse Gases (GHG) Emissions	
Chapter 9	Noise and Vibration	
Chapter 10	Landscape and Visual	
Chapter 11	Waste and Resources	
Chapter 12	Biodiversity	
Chapter 13	Social Environment	
Chapter 14	Labour and Working Conditions	
Chapter 15	Community Health and Safety	
Chapter 16	Cultural Heritage	
Chapter 17	Cumulative Impacts	The assessment of cumulative impacts represents the combination of multiple impacts that may result when the Project is considered alongside with other proposed projects, including those currently under development, in the same geographic area or with similar development timetable. Multiple impacts upon the same receptor of the Project are identified and assessed.
Chapter 18	Stakeholder Engagement, Information Disclosure and Consultation	Outlines the information disclosure, consultation and participation activities that have been undertaken as part of the ESIA process.
Chapter 19	References	Presentation of the references used during preparation of this Draft ESIA Report.
Appendices		

1.5.3 Environmental and Social Management Plan (ESMP)

The primary aim for formulating and implementing the ESMP is to safeguard the environment, Project personnel and the local population against Project activities which may cause harm or nuisance. For the purposes of the ESMP, “management” will be the control or mitigation measures and procedures required in managing key environmental and social effects. In addition, the ESMP will outline monitoring requirements, and these will be defined as monitoring, measurement, site inspection and audit.

The ESMP, which focuses on assessment of potential environmental and social impacts associated with the activities performed in the construction and operation phases of the Project, is not available yet. The Consultant will prepare a framework ESMP in accordance with Terms of Reference that will be based on the assessment of baseline conditions and expected impacts.

The ESMP will:

- Present the Lenders’ standards, guidelines and legal requirements that should be adopted during construction and operation (including any additional environmental permitting requirements);
- Set out the institutional framework for implementing the measures including where further strengthening is required or where the proponent may be required to put additional measures in place;
- Describe the proposed measures, including their timing and implementation arrangement;
- Define responsibilities for implementing the proposed measures, including for monitoring and evaluation;

- Establish the environmental and social monitoring and evaluation plan for construction and operation phases;
- Identify monitoring activities and key performance indicators that the Project should aim to achieve;
- Present construction guidelines that address how contractors should incorporate environmental and social considerations in their overall work. These would be presented as an Environmental and Social Checklist during the construction phase; and
- Provide a framework for the management of emergency situations during construction and operation.

The ESMP is a live document and will require regular review by the Project Company, as set out within it; hence it is subject to future modification if required.

1.5.4 Environmental and Social Management System (ESMS) Plans and Procedures

The Project Company has developed Health, Safety and Environment Policy, Quality Policy, Information Security Policy, Supply Chain Policy, Social Policy and HR Policy and published on the company website. The Project Company has developed and is implementing two management systems connected to each other, one is Integrated Management System (IMS) which is mainly for International Organization for Standardization (ISO) certification with plans and procedures, and they are in line with the ISO Standards. Second system is the corporate Environmental and Social Management System (ESMS) for existing and new projects which includes policies, plans and procedures.

Within the scope of ESMS, the Project Company has developed following corporate plans and procedures which are applicable to the Project;

- Environmental and Social Management Plan
- Training Management Plan
- Risk Assessment Procedure
- Environmental and Social Impact Assessment Procedure
- Noise and Vibration Management Plan
- Permit Register Plan
- Grievances Mechanism Procedure
- Land Acquisition Plan
- Resettlement Action Plan
- Occupational Health and Safety Management Plan
- Community Health and Safety Plan
- Traffic Management Plan
- Labour Management and
- Equal Opportunities Plan
- Supply Chain Management Plan
- Internal Audit System Plan for ESMS
- Air Quality Management Plan
- Waste Management Plan
- Wastewater Management Plan
- Pollution Prevention and Resource Efficiency Management Plan
- Hazardous Material Management Plan
- Stakeholder Engagement Plan
- Emergency Response Plan
- Livelihood Restoration Plan
- Cultural Heritage Management Plan
- Social Responsibility and Community Development Plan
- Security Management Plan
- Labour Management Plan
- Labor and OHS Audit System Plan
- Contractor Management Plan
- Supplier and Contractor System Plan
- Corporate Biodiversity Management Plan

The Project specific ESMS plans and procedures which will be prepared by the Consultant for both construction and operation phases of the Project are listed below.

- Traffic Management Procedure
- Emergency Preparedness and Response Plan
- Biodiversity management Plan
- Invasive Specie Management Plan

1.6 Limitations and Uncertainties

This ESIA Study is based on documentation and information provided by the Project Company between December 2023 and May 2024.

The limitations and uncertainties involved within the scope of ESIA study are listed below.

- Limited availability or accuracy of baseline data for environmental and social parameters including biodiversity, water quality, air quality and cultural heritage may affect the reliability of impact assessments.
- The impact of the wind turbines on avifauna and bat populations may be uncertain given the variability in migration patterns and behaviours.
- Due to the limited timescale, it is not possible to undertake the biodiversity baseline surveys, and the biodiversity assessment is mainly a desktop study that relies on National EIA and other available white and grey literature, which poses significant limitations to the biodiversity component of the ESIA study due to field data quality or quantity.
- The changes in environmental and social regulations during and after the ESIA study may introduce uncertainties regarding the compliance requirements of the Project.
- Identifying cumulative impacts on ecosystems and communities may be challenging due to complex interactions and dependencies.

Several limitations and uncertainties associated with the third-party work related to ESIA study are listed below.

- The predictive models used for air quality, noise, shadow flicker, and visual impact assessment may have limitations in capturing real world conditions accurately.
- The assessment of potential impacts on human health from noise, air quality, etc. may have limitations due to acquiring scientific understanding and variations in individual sensitivity.

It essential to acknowledge these limitations and uncertainties to provide a realistic and transparent assessment. The Consultant has applied several studies and strategies to decrease and eliminate these challenges for ensuring more robust and reliable outcomes within the scope of ESIA study, as listed below.

- Conducting field studies to gather real-time and accurate data.
- Developed mechanisms to ensure ongoing effectiveness of mitigation measures, such as constant monitoring, assessment and adjustment of mitigation measures involving the integration of real-time data collection; continuous risk assessment; and adaptive management strategies.
- Established a robust monitoring plan to verify effectiveness of mitigation measures during the construction and operation phases and ensure any deviations from the predicted impacts are promptly identified and addressed, reducing uncertainties associated with the long-term effects of the Project.

Any limitations and uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data are explicitly stated in relevant chapters of this Report. Where

applicable, the ESIA makes commitments concerning measures that should be put in place with monitoring and/or environmental or social management plans to deal with such uncertainties.

2 Project Description

2.1 Project Overview

This Chapter provides a detailed description of the Project regarding its need, location, components, and overview of the proposed Project activities which are to take place during the planning, construction and operation phases.

2.1.1 The Project

As described in Section 1.1, BBE will construct and operate a wind power plant, namely Pelit WPP. The Project comprises of 14 turbines, ((13 x 5,7 MWm/5,7 MWe) + (1 x 5,9 MWm/5,9 MWe) and a total installed power of 80 MW_m/ 80 MW_e.

The Project will involve the following works:

- Construction of 14 wind turbines and related parts (e.g., the cabling systems), a switchyard, an administrative building, access and site roads, and the ETL for the Project; and
- Operation of 14-turbine Pelit WPP.

According to the Project schedule, the construction phase is expected to be 13 months, and the duration of operation phase will be 47 years. It is expected that the total number of workforce for the construction phase will be 50 at peak times, while this number is expected to be 20 during the operation phase. Further details on the Project are provided throughout this Chapter.

2.1.2 Need for the Project

Energy has a major role in production processes as well as for human settlements, and demand to energy increases drastically with the increased population and industrial activity. Therefore, energy use is one of the key indicators of economic and social development and growth potential of a country. Due to the need for widespread use of electrical energy in daily life, the amount of electrical energy usage in countries is considered as an important indicator of social development [5,6]. With the Covid-19 outbreak and the latest news around the globe regarding energy crisis, the vitality of secure, affordable and people-centred transition in energy generation and use is once more sparked.

The need for primary energy[7] is constantly growing in the World, as well as in Türkiye. Considering that the primary energy use is currently dominated by non-renewable energy resources worldwide, mostly by the fossil fuels, the reliability of non-renewable resources points out significant question mark for today's World and for the future generations. Moreover, the extraction and use of fossil fuels directly contribute to global climate change, resulting in changes in the aquatic and terrestrial ecosystems, threatening human life on Earth. On the contrary, renewable energy resources are clean, reliable and sustainable when comparing with fossil fuels. Utilization of renewable energy resources plays an important role in eliminating

[5] World Bank. (2023). *Energy Overview*. Retrieved 2 April 2024, from https://www.worldbank.org/en/topic/energy/overview#1 on 2 April 2024.

[6] McKinsey & Company. (2019). *The decoupling of GDP and energy growth: A CEO guide.* Retrieved 2 April 2024, from https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-decoupling-of-gdp-and-energy-growth-a-ceo-guide#/.

[7] Primary energy is defined by the International Energy Agency (IEA) as "energy that has not been subjected to any conversion or transformation process". (2017)

dependence on other countries for the supply of primary energy and improving sustainable development.

Utilizing renewable energy resources such as wind, solar, biomass, wave, and current in Türkiye with its high potential and integrating these resources to the economy has a strategic importance in terms of ensuring resource diversity. It is aimed with the Project to ensure more efficient use of public resources in Türkiye by increasing the number renewable energy power plants; and as a result, supporting local renewable energy resilience and potential by diversifying the energy mix of the country.

Wind power is one of the fastest-growing energy sources in the world, and it offers many benefits for national socio-economic development and energy security. The Project is of critical importance since it will contribute to reaching national renewable energy generation targets and minimizing the external energy dependency by utilization of Türkiye's already existing wind energy potential. Furthermore, the Project is aimed to contribute combatting climate change by decreasing dependency on fossil fuels by utilization of wind power.

2.2 Project Location and Layout

2.2.1 Location

The Project licence area falls within one province of Türkiye; namely Sivas, which is located in the Central Anatolia region of Türkiye. Figure 2.1 provides the location of Sivas province in Türkiye.

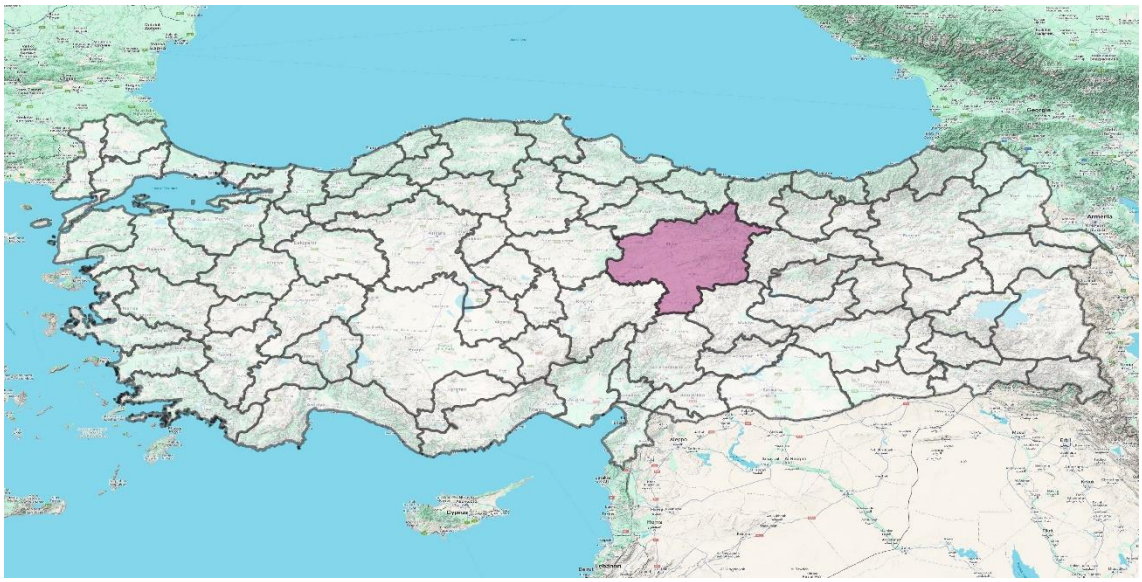


Figure 2.1: Province of Türkiye where the Project Licence Area Falls within

According to the Wind Power Plants Report published by Türkiye Wind Energy Association (TÜREB), considering the share of wind turbine power plants in operation in the Central Anatolia, Sivas ranks 17th with an installed capacity of 155.30 MWm (2.04% share)[8].

The locations of main Project components (i.e., turbines, access roads, switchyard) as well as the associated facility (i.e., Energy Transmission Line) are listed below:

- Turbines T1 to T14 are located in Gürün District, Sivas

[8] Turkish Wind Energy Association, 2019. Turkish Wind Energy Statistic Report.

- Access road is located in Sivas Province, connecting the turbine area from Kayseri-Malatya Highway to Gürün District.
- Switchyard area (including the administration building) is located in Gürün District, Sivas.
- ETL of the Project will be located in Gürün District, Sivas; connecting the Project substation to the existing R-3 WPP Transformer Station
- CBP's of the project will be located Çiçekyurt neighbourhood in Gürün District, Sivas

In addition, the need for on-site access roads which will provide access to the Project units to the site will be met by opening new roads (approximately 49 km[9]) and/or improving/expanding the existing roads (approximately 2.5 km[5]) within the Project area.

2.2.2 Climate and Wind Conditions

Sivas has a continental climate. Winters are cold and harsh, there is usually plenty of snowfall in the winter months and it is covered with snow for an average of 3-5 months. Summers are hot and dry, spring and autumn months are rainy.

2.2.2.1 Climate

The average daytime temperature in the region is 20.2°C in August, while the coldest month is January with an average maximum daytime temperature of -7.3°C. The number of hours of sunshine per day is highest in July with 11.9 hours of sunshine. The relative humidity in the region averages 66.7% in April, while it is easier to endure in September. Meteorological data of Sivas province, where the Project licence area is located, are provided in Table 2.1.

Table 2.1: Meteorological Data of Sivas Province (1930 – 2023 Measurement Period) [10]

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Mean Temperature (°C)	-3.4	-2.1	2.7	9.0	13.5	17.0	20.0	20.2	16.2	11.0	4.8	-0.6	9.0
Mean Highest Temperature (°C)	0.9	2.6	8.1	15.3	20.1	24.1	27.8	28.6	24.7	18.6	10.9	3.7	15.4
Mean Lowest Temperature (°C)	-7.3	-6.2	-2.1	3.1	6.9	9.6	11.7	11.8	8.1	4.2	-0.2	-4.3	2.9
Mean Daily Sunshine Exposure (hour)	2.6	3.6	4.8	6.3	8.1	10.5	11.9	11.4	9.4	6.5	4.2	2.5	6.8
Average Number of Rainy Days	12.9	12.1	13.3	13.3	13.9	8.7	2.4	2.0	4.2	7.7	9.3	12.1	112.2
Mean Monthly Total Precipitation (mm)	43.0	39.1	46.1	56.3	60.3	35.2	9.3	6.7	17.8	33.0	40.2	44.1	431.1
Highest Temperature (°C)	18.6	18.1	25.2	29.0	33.5	35.5	40.0	39.9	37.0	30.5	24.0	19.4	40.0
Lowest Temperature (°C)	-31.2	-34.4	-27.6	-11.0	-5.5	-0.6	3.0	3.2	-3.8	-9.0	-24.4	-30.2	-34.4

[9] En-Çev Enerji Çevre, 2018. Project National EIA Report.

[10] Provincial General Statistical Data. Ministry of Environment, Urbanization and Climate Change, General Directorate of Meteorology. Retrieved 1 April 2024, from https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?k=A&m= SIVAS.

Meteorological information gathered from Kangal Meteorology Station (for the 1959 – 2017 period) under the National EIA studies are listed below:

- The annual average pressure is measured as 847.6 hPa. the annual maximum pressure is 862 hPa and the annual minimum pressure is 822.5 hPa. The month with the maximum pressure was December with 862 hPa. and the month with the minimum pressure was February with 822.5 hPa.
- The annual average temperature is 6.7 °C. the annual maximum temperature is 41 °C. and the annual minimum temperature is -36.2 °C. The month with the maximum temperature was July with 41 °C and the month with the minimum temperature was January with -36.2 °C.
- The annual total precipitation average is 356.4 mm. The month with the maximum precipitation was May with 59.1 mm.
- The annual average humidity is 66.7%. The monthly maximum relative humidity average is 79.7% in January and the monthly minimum relative humidity average is 14.8% in September.
- The average number of annual foggy days is 1.1. the average number of hail days is 0.3, the average number of frost days is 2.3, the number of thunderstorm days is 0.1, whereas the number of snowy days is 27, and the number of snow covered days is stated as 88.7.
- The maximum snow depth was observed in February with a maximum of 145 cm.

2.2.2.2 Wind Conditions

Wind roses are used for characterizing the speed and direction of winds at a specific location. Wind rose diagram is an important tool for the WPP projects as they pave the way for understanding the site wind characteristics, energy production potential, microclimates and wind variability; whereas helping efficient design and operation of wind power projects. The wind rose diagram of Sivas Province are provided in Figure 2.2.

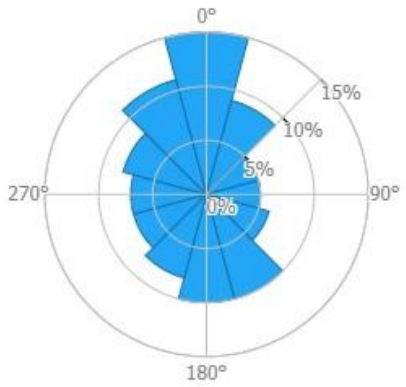


Figure 2.2: Wind Rose Diagrams of Sivas Province[11]

According to the official wind measurement data specific to the Project area, it has been reported that the annual average wind speed of the Project area is approximately between 7-8.5 m/s. Figure 2.3 below shows the annual average wind speed distribution of Sivas province. In

[11] Global Wind Atlas. Retrieved 1 April 2024, from https://globalwindatlas.info/en/area/Turkey.

this sense, the Project area is expected to be one of the regions with the maximum wind speed in Sivas province.

In addition, capacity factor of wind turbines describes the gap between nominal and realistic power production of a wind turbine at a certain location over a period of time and it is the ratio of the wind turbine's actual power output to its nominal or maximum power output. For Türkiye, a capacity factor of 25%[12] and above calculated for wind turbines is considered feasible for investment. It has been stated that the capacity factor of the Project region is approximately 40-45 % based on official capacity factor data relevant to the Project area. Figure 2.4 below shows the capacity factor distribution of Sivas province.

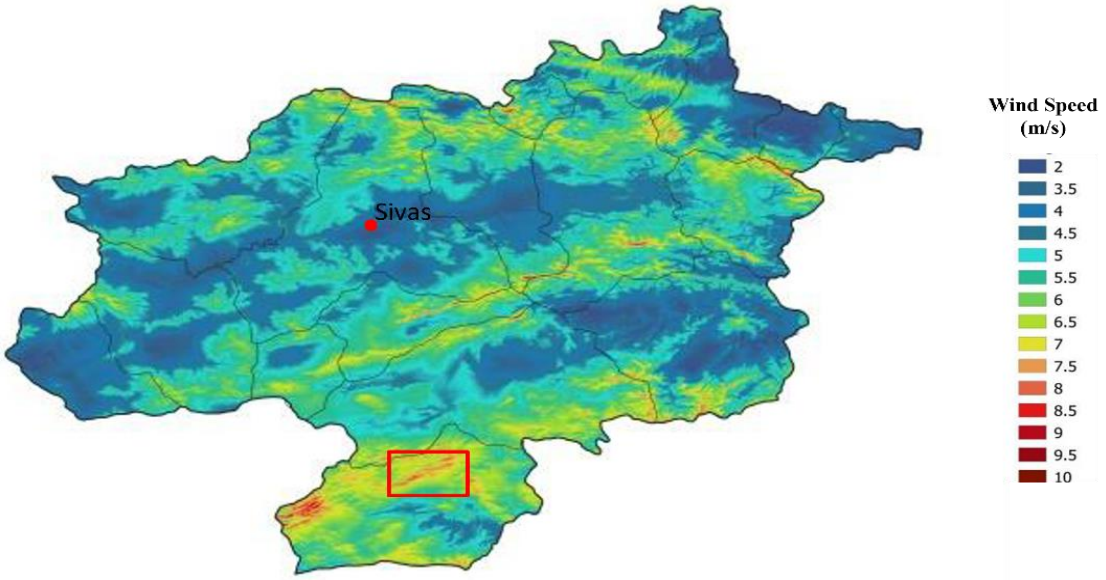


Figure 2.3: Annual Average Wind Distribution of Sivas Province[13]

[12] Research Gate, Retrieved 1 April 2024, from https://www.researchgate.net/publication/318019539_Ruzgar_Turbinlerinde_Kapasite_Faktoru_ve_Turbin_Sinifi_Iliskisi_Capacity_Factor_in_Wind_Turbines_and_Turbine_Class_Relationship

[13] Ministry of Energy and Natural Resources. Accessed from repa.enerji.gov.tr on 1 April 2024.

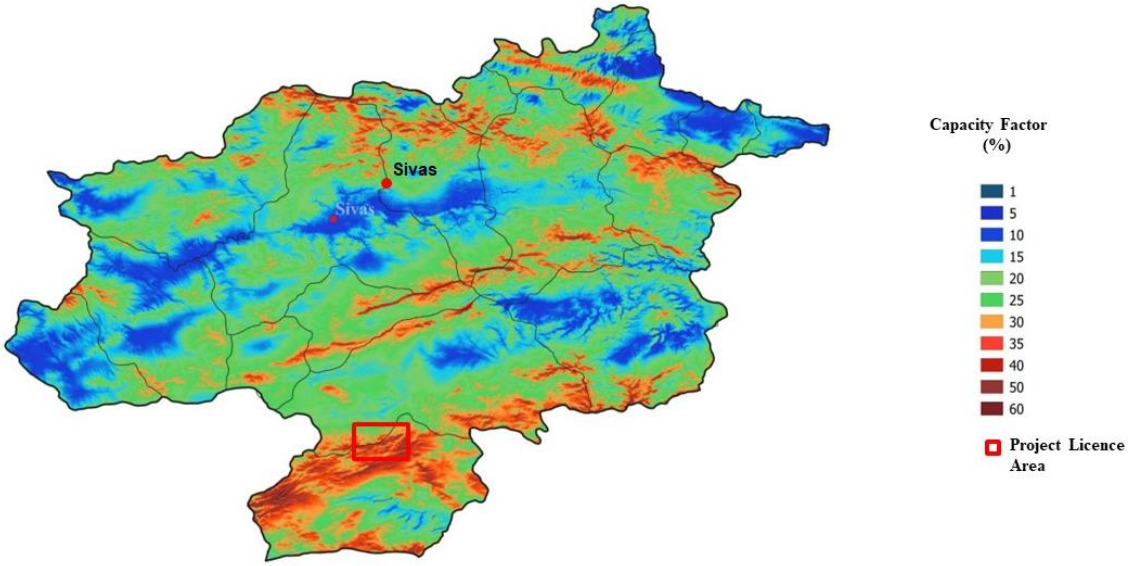


Figure 2.4: Capacity Factor Distribution at 100 Meter[14,15]

2.2.3 Layout

The general illustration of Project license area is presented in Figure 2.5 and Figure 2.6. According to the 1/100,000 scale Master Plan (*ÇDP in Turkish*) of Yozgat-Sivas-Kayseri planning region, some sections of the Project area fall within the “Meadow-Pasture”, “Agricultural Land” and “Stream-Creek” representations. In this context, the Project has an obligation to secure the Non-Agricultural Use Permit. The summary of legislative obligations regarding the master plan are provided in Table 2.2, and the detailed information regarding zoning plans and master plans, which the Project area falls within, are provided in Section 2.5.1.2 of this Chapter.

The CBP’s are located to the southwest of turbine T01.[16]

There is no expropriation of forest areas within the Project. The Project Area does not encompass any nationally protected areas or internationally recognized protected areas (Key Biodiversity Areas - KBA or Important Bird and Biodiversity Areas - IBA, Important Plant Areas - IPA).

[14] Ministry of Energy and Natural Resources. Accessed from repa.enerji.gov.tr on 1 April 2024.

[15] The capacity factor distribution map was prepared by taking into account the technical values of a 3 MW wind turbine.

[16] The coordinate of CBP’s are 38°50'30.8"N 37°04'15.9"E

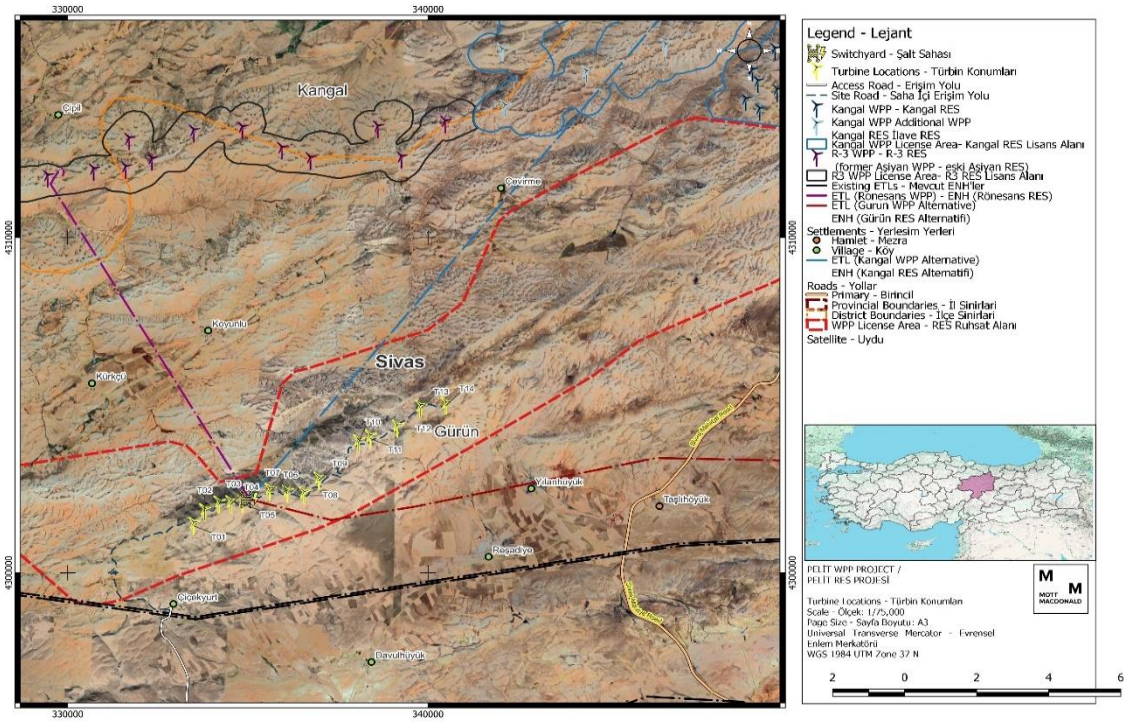


Figure 2.5: 1/75,000 Scale Representation of Project Licence Area

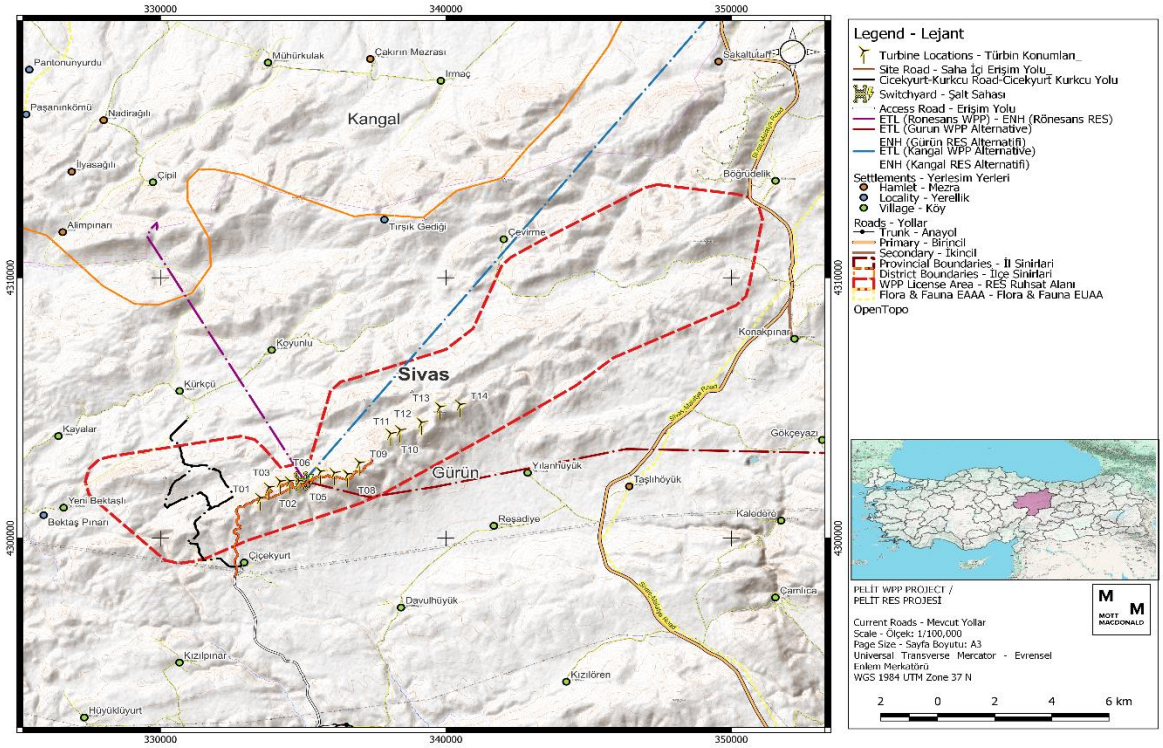


Figure 2.6: 1/100,000 Scale Representation of the Project Licence Area

Table 2.2: Project Summary Table within the Scope of 1/100,000 Scale Master Plan

Demonstration Area within the Scope of Master Plan	Do Project Units Remain in the Master Plan Demonstration Area?					Basis of the Obligation	Are the Units in the Area Subject to Permit?
	Power Plant	Turbine	Switchyard	Access Road	ETL		
Meadow-Pasture	Yes	Yes	Yes	Yes	*	Pasture Law (No. 4342)	Yes
Agricultural Land	No	No	No	No	*	Soil Conservation and Land Use Law (5403), Soil Conservation and Land Use Law Implementation Regulation Law on Agricultural Reform on Land	No
Stream-Creek	No	No	No	No	*	Aquaculture Law (No. 1380)	No

Source: Project National EIA Report, 2018.

*:Will be added when Project Introduction Document prepared

2.3 Project Components

The Project comprises the construction and operation of 14 horizontal axis wind turbines (HAWTs) to provide a maximum licensed power capacity of 80 MW_m to be delivered to the national grid system. Table 2.3 provides a summary of design parameters determined and accepted for the Project in accordance with the types of turbines used.

Table 2.3: Project Design Parameters

Design Parameter	Enercon GmbH[17]
General	
Project generation capacity	80 MW
Technology type	HAWT
Number of wind turbines	14
Type of wind turbine	Nordex N163/5.x 5900kW
Nominal power	5900 kW
Wind class (IEC)	S
Design service life	25 years
Cut-in wind speed	3 m/s
Cut-out wind speed	26 m/s
Cut-back-in wind speed	25.5 m/s^2
Rotational speed, max	10.5 U/min
Ambient temperature for normal operation	-20 °C to +40 °C
Sound power level	99.0 – 106.0 dB(A)
Rotor	
Number of Rotor Blades	3
Rotor Diameter	163 m
Swept Area	20,867 m^2
Rotor Axis Angle	5°

[17] ENERCON GmbH. (2021). *ENERCON E-138 EP3 wind energy converter Technical Description.*

Design Parameter	Enercon GmbH[17]
Total Blade Length	79.7 m
Rotor Blade Material	Composite fibreglass
Tower	
Hub Height (HH)	105 m
Tip Height	200 m

The Project consists of three main units, temporary facility (CBP and associated facilities (i.e., the ETL) subject to this ESIA study. The main units are; the basic component "turbine" which will be the main unit for energy production, the “switchyard” which will transmit the energy produced from the turbines to the national grid, and the “access roads” which will serve for the transportation purposes to the turbines and the switchyard area of the Project. The general layout of all project components including the associated facilities are presented in Figure 2.5 and Figure 2.6 in 1/75,000 and 1/100,000 scales.

2.3.1 Wind Turbines

Wind turbines are the main structural elements of wind power plants, and work on a simple principle which is converting the kinetic energy of moving air first into mechanical energy and then to electrical energy. The wind rotates the turbine blades two or three times around the rotor. The rotor is connected to the main shaft, which turns a generator to produce electricity. HAWTs typically have two or three blades. The HAWTs mainly include a foundation, tower, nacelle (containing a machine house and yaw drives), generator, rotor hub, and rotor blades.

In the scope of the Project, 14 horizontal axis wind turbines with the following main design properties will be used[18]:

- Type: Nordex N163/5.x 5900kW
- Hub Height: 105 m
- Rotor Diameter: 163 m
- Nominal Power: (5.9 MW_m/5.9 MW_e x 1)+(5.7 MW_m/5.7 MW_e x 13)
- Swept Area: 20,867 m^2

The design parameters of the wind turbines to be used within the Project is provided in Table 2.3. The Nordex N163/5.x wind turbine is a direct-driven wind energy converter with a 3-bladed rotor, automatic pitch bearing lubrication, active pitch control, carriable speed operation and a nominal power of 5,900 kW. The rotor hub consists of a base element with support system and spinner. The base element consists of a stiff cast structure, on which the pitch bearings and the rotor blades are assembled. The rotor hub is covered with the spinner which enables the direct access from the nacelle into the rotor hub. Nordex wind turbines are equipped with technical equipment and devices that protect people and systems and ensure permanent operation. The entire turbine is designed in accordance with the Machinery Directive 2006/42/EC and certified as per IEC 61400.

Safety-related parameters in the system control are monitored continuously. Here, the sensor data of the safe sensors are transmitted via a safe bus system to the safe controller for evaluation. If specified parameters are exceeded, the system is stopped via safe actuators and set to a safe state. Depending on the cut-out cause, different brake programs are triggered. In event of external causes, such as excessive wind speeds or below operating temperatures, the wind turbine is gently braked by means of rotor blade adjustment.

[18] Data accessed from the Document Provided by the Project Company on 08 January 2024.

The turbines operate automatically. A programmable logic controller (PLC) continuously monitors the operating parameters using various sensors, compares the actual values with the corresponding setpoints and issues the required control signals to the WT components. The operating parameters are specified by Nordex and are adapted to the individual location. The controller is located in a switch cabinet in the tower base.

When there is no wind the WT remains in idle mode. Only various auxiliary systems are operational or activated as required: e.g., heaters, gear lubrication or PLC, which monitors the data from the wind measuring system. All other systems are switched off and do not use any energy. The rotor idles. When the cut-in wind speed is reached, the turbines changes to the “ready for operation” condition. Now all systems are tested, the nacelle turns into the wind and the rotor blades turn into the wind. When a certain speed is reached, the generator is connected to the grid and the WT produces electrical energy.

At low wind speeds the WT operates at part load. The rotor blade remains turned into wind to the maximum extent. The power produced by the WT depends on the wind speed.

When the nominal wind speed is reached, the WT switches over to the nominal load range. If the wind speed continues to increase, the speed control changes the rotor blade angle so that the rotor speed and thus the power output of the WT remain constant.

The yaw system ensures that the nacelle is always optimally aligned to the wind. To do these two separate winds measuring systems on the nacelle measure the wind direction. Only one wind measuring system is used for the control system, while the second system monitors the first and takes over in case the first system fails. If the wind direction measured deviates too much from the nacelle alignment, the nacelle is yawed into the wind.

Furthermore, two separate cooling circuits ensure cooling of the large components. Converter and gearbox are cooled in one cooling circuit and generator and transformer in the other. Both cooling circuits are connected to passive coolers on the nacelle roof, in which the water is recooled. Basic schematic of the cooling system is shown in Figure 2.7.

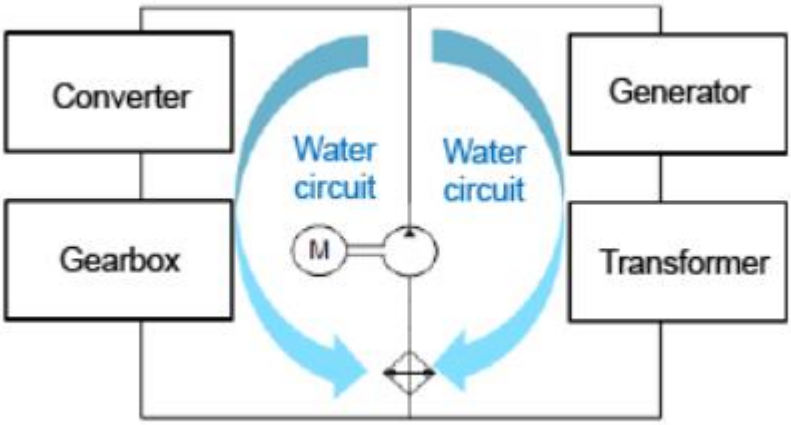


Figure 2.7: Basic Schematic of the Cooling Circuit

Nordex N163/5.x internal mechanism is shown in Figure 2.8.

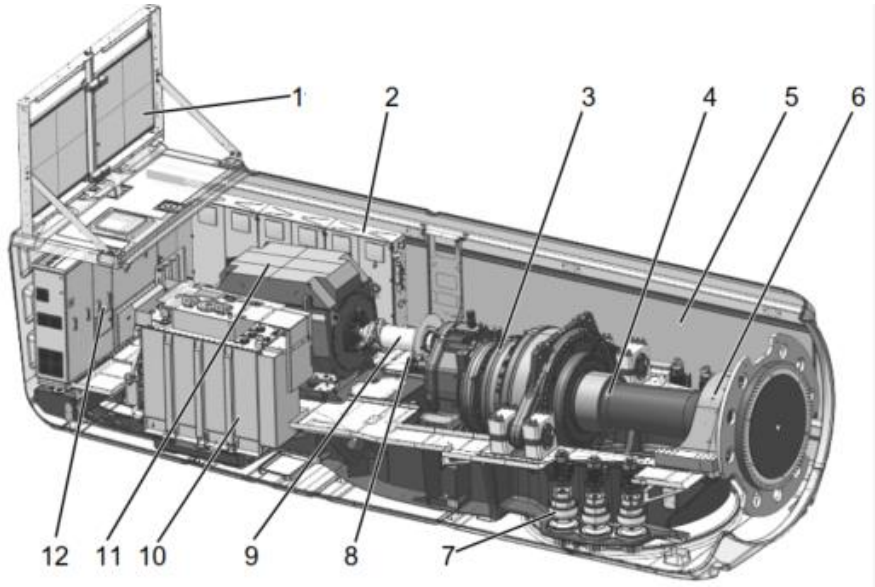


Figure 2.8: Schematic Diagram of the Nordex's Nacelle[19]

The legend of Figure 2.8 is shown below;

1. Passive cooler
2. Switch cabinet
3. Gearbox
4. Rotor shaft
5. Nacelle cover
6. Rotor bearing
7. Yaw drives
8. Rotor brake
9. Coupling
10. Transformer
11. Generator
12. Converter

2.3.2 The Switchyard

The wind turbines will be connected at the switchgear panels through a cross linked cabling system to the switchyard located within the Project area. The connection between the turbines and the switchyard will be made using underground transmission cables buried in ground. The cables are selected as AL core XLPE insulated underground MV cables. The connection between the switchyard and substation will be provided by 154 kV approximately 12 km transmission line.

2.3.3 Access Roads and Site Roads

There are two types of Project roads, namely – access and site roads. Access roads cover the path between the end of transport road and the start of site roads while site roads cover the path along the wind turbines inside the Project area.

As mentioned in the Project National EIA Report, there will be need for opening additional roads for access to the Project area during the construction phase; and enhancements will be made to some portion of existing roads. Furthermore, it was noted that connection of the Project area will be made from D300 Kayseri-Malatya Highway Connection through the Çiçekyurt Village Road.

[19] Technical Description of the Nordex Delta 4000 – N163.5/5.x

These connection roads are defined as “access roads” in this Draft ESIA Report prepared by the Consultant.

It was observed during the site visit that there will be adjustments (i.e. mainly widening) made at the existing access roads for better execution of transport activities for land preparation and construction stages, such as for safe transport of construction machinery to the Project area. At this stage of the design, the final access roads routes are not yet defined by the Project Company. According to information provided by the Project Company, within the scope of the Project, new access and site roads will be constructed (approximately 18.1 km) in accordance with development plans and the width of the roads is planned to be 4 m.

2.3.4 Administration Building

An administration building will be constructed in the switchyard area for the Project. The administration building will consist of the Nordex SCADA[20] system room, a working station for the monitoring of the Project, facilities for maintenance personnel as deemed necessary, as well as storage areas. The Administration Building is designed to deploy full operational staff, not only technical but also administrative staff. According to National EIA Report, the needs of the workers, including facilities such as restrooms and changing rooms, will be accommodated within the administration building in the Project area.

2.3.5 Temporary Facilities

Concrete Batching Plants (CBP) will be constructed and operated for only construction period of the Project as temporary facilities. Two CBPs, which will be used for mixing cement and other materials for producing ready-mixed concrete for turbines, has direct impacts as part of the Project, and therefore associated impacts will be further considered in this ESIA.

In addition, according to Annex II of the National EIA Regulation specifies that "ready-mixed concrete plants with a production capacity of 100 m3/hour or more" are exempt from the National EIA, and the exemption letter prepared by the Sivas Governorate Provincial Directorate of Environment, Urbanisation and Climate Change was received on 8 July 2024. However, when the CBP is installed and made ready for operation is assessed under the Annex II Article 2.12 of National EIA regulation that "Ready-mixed concrete facilities with a production capacity of 10 m^3/hour or more", it is necessary to apply to the MoEUCC and obtain a Temporary Activity Certificate (TAC). According to information shared by the Project Company that TAC process is ongoing.

2.4 Project Associated Facility

In addition to the Project components, the Project activities also cover construction of the ETL for connection of the generated electricity to the national grid. The ETL will be constructed by the Project Company, but the ownership will be under Turkish Electricity Transmission Corporation (TEIAS) once connection is completed. The Consultant has been informed that permitting process for the ETL is being managed by TEIAS. According to the information provided by the Project Company, the EIA process of the ETL has not started yet**.** Expropriation process of the ETL will commence once permitting process of the WPP is completed. The Associated facility is a 154 kV single-circuit ETL of approximately 12 km for connection to existing Kangal Transformer Substation, which is currently operated by TEIAS.

[20] Supervisory Control and Data Acquisition

At this stage, the ETL is the only facility identified as an Associated Facility of the Project. There will not be any other facility considered as a project associated facility such as quarries, borrow pits, wastewater treatment plant, landfilling site, etc.

2.5 Project Activities

Project activities are planned to consist of three phases:

- Pre-licence (permitting) phase, encompassing the completion of necessary design measurements and permitting processes.
- Construction (licence) phase, involving site preparation, infrastructure, and assembly operations as well as commissioning test studies.
- Operation (production licence) phase, where the connection to the interconnected system is established through temporary-final acceptance processes, enabling electricity production.

The activities will be carried out simultaneously in each stage, and it is planned to complete the pre-construction, construction, and assembly works within 27 months. The timeline for the Project, which was provided by the Project Company on 6 December 2023, is presented in Table 2.4. As of end of January 2024, when the site visit was conducted by the Consultant, the site roads were not being constructed.

Table 2.4: Pelit WPP Project Schedule

Activity Category	Activity Name	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Permitting	Engineering, Procurement												
	WTG Tender												
	Investment Decision of the Board												
	Feasibility update with LTA'23												
	Financing (w/WTG Vendor)												
Civil Construction Works	WTG NTP												
	WTG Manu&Trans												
	Cons Start												
	Cons Installation. Comm.												
Planned COD													

Source: Provided by the Project Company on 6 December 2023

2.5.1 Pre-licence (Permitting) Phase

Pre-licence phase covers the activities carried out in the timeframe between obtaining the necessary approvals, permits and licence and obtaining the energy production licence.

2.5.1.1 Site selection

There are several factors considered during the site selection process to ensure minimal environmental impact and optimal energy generation.

- Access to and within the Project Area: The Project Company shared the information with the Consultant that, within the scope of the Project, there will be no widening on the existing road, but new road constructions will be made.

- Wind Potential of the Project Area: The Project Company plans to install 14 turbines in Sivas. The Türkiye Energy Potential Map (REPA) indicates a maximum wind speed of 9.41 m/s in Sivas, with average of 5.05 m/s. Project-specific wind measurements indicates an annual average speed of approximately 7-7.5 m/s.
- Avoiding physical displacement regarding land acquisition: While determining the lands needed for the Project, criteria that will minimise the negative social and economic impacts arising from land acquisition have been taken into consideration by avoiding resettlement as much as possible. Collective findings indicate that the Project aligns with the existing land use patterns and regulatory frameworks, fostering socially responsible land acquisition process that Project Affected Persons (PAPs) are approached in a sensitive manner.

2.5.1.2 Land Acquisition

The Project site is located in a region consisting entirely of pasture areas. In this region, local community members who are engaged in animal husbandry are generally engaged in pasturing. According to the information obtained from the National EIA, the land is generally unsuitable for agriculture and sloping.

Land Acquisition Plan prepared by the Project Company issued on 28 February.2023 includes the policies, standards and requirements of reference that are applicable, but not limited to, for the Project during all phases.

Within the scope of the Project, it is not planned to carry out transactions on any private parcel. The operations on the parcels will be carried out entirely in the pasture areas belonging to the Treasury. In total, there are 42 different title deeds, and the pasture status of each land has been changed by the land registry office within the scope of the Project. The Project Company will complete the turbines and on-site roads within the licence area through construction works on these parcels.

Details of land transactions; current land acquisition and expropriation status and potential impacts can be found in *Chapter 13. Social Environment* and Section 13.3.3 Land Use and Ownership of Assets.

2.5.1.3 Permitting

The Project Company has secured a production license which is 20 turbines and total installed capacity of 80 MWm/80Mwe, for the Project on 12 May 2022 to be valid for 49 years. However, after the number of turbines and ETL location have undergone a revision, as the number of wind turbines has been reduced from 20 to 14 and the unit power of wind the turbines which will be constructed, has increased from 4 MW to 5.7 MW for 13 turbines and to 5.9 MW for 1 turbine and ETL connection region has been changed from Tanır WPP TS to Gürün WPP TS. The Project Company has granted renewed production license for the Project on 17 August 2023 to be valid 47 years and 8 months, which reflects the new ETL connection region but the production licence does not reflect new number of turbines.

The EIA Application File was submitted to the MoEUCC on 18 May 2018. The final National EIA report prepared by EN-ÇEV was submitted to the MoEUCC in May 2018. Upon submission of the Final EIA Report to the MoEUCC General Directorate of Environmental Impact Assessment, Permit and Inspection, the “EIA Affirmative” decision for the Project was published on 28 May 2018 by the MoEUCC.

The “EIA Affirmative” decision of the Pelit WPP Project, which is planned to be operated by Pelit Enerji was requested to be transferred to Borusan ENBW Enerji Yatırımları ve Üretim A.Ş. by the Energy Market Regulatory Board Decision dated 06 April 2023 and numbered 11779-19.

Upon the submission of Final National EIA Report, there were additional amendments regarding locations of several wind turbines. The amendments included a reduction in the number of wind turbines and an increase in the unit power of the turbines. In this sense, the amendments on National EIA process is reported by the Project Company to be ongoing at the time of preparation of this Draft ESIA Report.

The Project Company has applied to relevant authorities to obtain necessary opinions under the Environmental Impact Assessment Regulation and obtain the Technical Interaction Permit document for the Project. Technical Interaction Analysis Decisions (TIA Decisions) were received from the relevant institutions and their opinions were reported to the MoENR General Directorate of Energy Affairs. According to TIA decision conveyed by the Ministry of National Defence on 17 April 2024, it was indicated that the Project might have an impact on the existing systems. As for turbines T1 - T14, it was proposed that they could be conditionally allowed, provided that their blades were fixed initially, and then they were brought down and disassembled directly when requested during crises, tensions, and war situations. If the preference is to install the turbines according to the provided wind turbine information, the amendment of the relevant preliminary license by the EMRA is required. Locations of turbines have not been changed in regard with the opinion letter of Ministry of National Defence.

Following the completion of the EIA process, the Project requires obtaining the following permits within the scope of relevant national regulations:

- All required pasture permits have been secured for the 20 turbines from the Ministry of Agricultural and Forestry regarding the Pasture Law of Law No. 4342. For the new layout of the Project, no required to obtained revised pasture permits.
- ETL EIA Process has not started yet.
- For the CBP, the exemption letter from Sivas Governorship has been taken on 08 July 2024.
- TAC Process is ongoing.

The Project Company projects the timeline to complete pre-construction permit and engineering activities by the end of Q2 of 2024, as such pasture permit has been completed. The timetable for the permitting activities of the Project is presented in Table 2.4.

2.5.2 Construction Phase

2.5.2.1 Timeline

The construction of the Project has been initiated in the second quarter of 2024 with the construction of Project roads and is planned to be completed by the third quarter of 2025. The Project construction schedule is provided in Table 2.4.

2.5.2.2 Method

Construction phase, also called as the Licence Phase, includes land preparation, excavation, infrastructure and installation activities within the Project licence boundaries. Construction phase activities include the following steps:

1. Clearing of vegetation and topsoil stripping for the turbine pads and access roads
2. Construction of site roads and access roads for access to and between turbines and/or rehabilitation of existing roads
3. Excavation/Earthwork operations (Turbine Towers, Cabling, Switchyard and Operation Building)
4. Transport of wind turbine parts to the Project area
5. Installation of wind turbine towers

6. Installation of other turbine parts (e.g., gearbox rotor hub, nacelle, rotor blades)
7. Cabling, installation of electrical systems
8. Turbine commissioning and testing

Site Preparation

Site preparation includes clearing of vegetation, topsoil stripping, compaction of soil, filling of low areas with imported fill/excavation soil and grading the entire area of the site to the required ground levels and slopes as required.

During the construction phase, the Project entails the provision of essential resources, including temporary warehouses, vehicles, and equipment. Additionally, a temporary firefighting and alarm system will be established. Temporary site drainage, stormwater, and sanitary drainage will be provided as needed for the site, facilities with proper sewage disposal measures. The Project also includes the installation of temporary site fencing, including gates, and the implementation of a first aid, site safety, and security system. Furthermore, temporary offices will be set up by the Project Company.

It is important to engage with local communities and stakeholders during the pre-construction phase. A Project-specific SEP covering the pre-construction, construction and operation phases has been prepared by the Consultant and will be updated upon the completion of the ESIA studies if necessary. The Project is committed to the SEP for all stakeholder engagement and consultation activities. In addition, a Project-specific grievance mechanism has been established for long-term communication between the Project and the stakeholders. Both the stakeholder engagement process and management of the grievance mechanism that will be followed throughout the Project lifecycle will be described in *Chapter 18: Information Disclosure and Consultation Activities* of this Draft ESIA Report.

Ground Loosening (Blasting) Activities

Within the scope of the Project, in cases where geological conditions are not suitable, ground loosening (blasting) activities will be carried out at the Project areas such as turbine areas, roads, etc. (only during the construction phase and if found necessary). The blasting method was chosen as the “Olofsson Method” and the type of explosive material will be ANFO as reported in the Project National EIA Report. ANFO is a mixture of ammonium nitrate (AN) and fuel oil (FO) which is widely used in mining and quarrying operations for blasting activities. It was also noted in the National EIA Report that the ANFO and dynamite to be used during blasting activities will be supplied from the Gendarmerie on a need basis, will not be stored on site and the explosions will be carried out under the control of the Gendarmerie. The nearby communities will also be informed by CLOs prior to blasting activities.

The ground loosening activities are to be carried out in accordance with the Regulation on the Procedures and Principles of Production, Import, Transportation, Storage, Sale, Use, Destruction and Inspection of Unmonopolized Explosive Substances, Hunting Equipment and Similar Products[21].

2.5.2.3 Construction Hours

The construction period is projected to last for 13 months. During the construction phase, the work schedule for labour is planned to be 13 months, working 24 days a month, with each working day consisting of 10 hours and one shift.

[21] Published in the Official Gazette Date/No: 29.09.1987/19589

It is to be noted that the construction activities will be carried out within the allowable construction hours in accordance with Regulation on Environmental Noise Control as well as IFC EHS Guidelines.

In addition, the noise levels arising from the machinery and equipment to be used during the construction phase of the 14 turbines will be below the limit values in the Environmental Noise Assessment and Management Regulation, which came into force in the Official Gazette dated 04.06.2010 and numbered 27601, were taken into account.

The dust emissions that will occur during the construction phase of the 14 wind turbines to be installed within the scope of the Project have been calculated by taking into account the dust emission factors given in the Regulation on the Control of Industrial Air Pollution, published in the Official Gazette dated 03 July 2009 and numbered 27277.

2.5.2.4 Equipment & Machinery

The types and quantities of construction equipment with respect to various construction works are listed in Table 2.5.

Table 2.5: Construction Equipment to be used for the Project

Equipment	Number
Excavator	12
Grader	2
Compactor	4
Water Truck	2
Loader	3
Dozer	1
Back-hoe loader	2
Concrete mixer truck	10
Truck	12

Source: Provided by the Project Company on 1 April 2024

2.5.2.5 Camp Site

According to the Project National EIA, it is not intended to create as a designated campsite for worker accommodations during the construction phase. The needs of the workers will be provided at the Administration building. (Please refer to further details on Section 2.3.4)

The guidelines in Workers' Accommodation: Processes and Standards, IFC and EBRD, Guidance Note, 2009 should be adhered to in the event that worker accommodations are required.

2.5.2.6 Resource Use

Within the scope of the Project, the utility water to be supplied from the nearby neighbourhoods' water network will be used during the construction phase to meet the personnel needs as well as to prevent the generation of dust during construction activities. The water used for dust control will remain within the soil structure, hence generation of wastewater is not anticipated. The drinking water required for the employees within the scope of the Project will be provided by permitted and licensed bottled water and demijohns sold in the market. The need for potable water will be met by purchasing from the city network and a 10-ton water tank will be allocated in the administrative building to store water.

Domestic wastewater generated during the construction phase of the Project will be collected in septic tanks. The septic tanks will be emptied by vacuum trucks when they reach 80% capacity to be disposed to the local sewer network in accordance with the “Regulation on Pits to be Constructed in Places Where Construction of Sewage Channels is Not Possible” regulation published in the Official Gazette dated 19 March 1971 and numbered 13783.

The electricity to be used in the Project construction area will be supplied from the national grid or generators. The fuel will be used due to the use of construction equipment and machinery and during the transportation of Project’s workers during the construction phase.

Excavated surplus material will be reused for filling purposes.

2.5.2.7 Construction Workforce

Within the scope of the Project, a total of 50 people is expected to work in the Project area during the construction phase.

2.5.3 Operation Phase

Operation phase, also called as the Production Licence Phase, is the period in which electricity production is carried out after connection to the national grid system is carried out. Operation phase starts with the commissioning of the power plant and initiation of electricity generation. After that, the produced electricity will be connected to the substation and to the national interconnected grid.

2.5.3.1 Project Life

According to Article 9 of the Electricity Market Licensing Regulation, published in the Official Gazette dated 2 November 2013 and numbered 28809, licenses are granted for a minimum of 10 and a maximum of 49 years, considering the nature of the activity.

According to the production license secured from EPDK with the board decision dated 17 August 2023, the Project will have an operational lifetime of 47 years, eight months and 25 days.

2.5.3.2 Permits to be Granted after Construction

Electricity generation licence need to be obtained once the electricity generation is started and connection to the national grid system is carried out. However, electricity generation licence for the Project has already been obtained by amending the production license of the Project on 12 May 2022.

Commercial Operation Deployment (COD) will be granted with a declaration of the Commercial Operation Date, indicating that the Project is officially in commercial operation and is delivering electricity to the grid for commercial purposes. The Project Company plans the process to obtain the acceptance in a timeline specified in Table 2.4.

2.5.3.3 Power Connection

The wind energy absorbed from the rotor is converted into electrical energy using a doubly-fed induction machine with slip ring rotor. Its stator is connected directly, and the rotor is connected via a specially controlled frequency converter, to the medium voltage transformer which connects the turbine to the grid. As a result, only a part of the power needs to be routed via the converter, permitting low electrical system losses.

Medium-voltage cables connecting the wind turbines, grounding cables, and communication cables (generally fibre optic) will be routed within the same cable channel. For the Project, the responsibility of operation and maintenance of the transmission line is under TEIAS.

2.5.3.4 Operational Workforce

Within the scope of the Project, a total of 20 people are expected to work in the Wind Power Plant during the operation phase.

2.5.3.5 Resource Use

Within the scope of the Project, the utility water to be supplied from the nearby neighbourhoods' water network will be used during the construction phase to meet the personnel needs as well as to prevent the generation of dust during construction activities. The water used for dust control will remain within the soil structure, hence generation of wastewater is not anticipated. The drinking water required for the employees within the scope of the Project will be provided by permitted and licensed bottled water and demijohns sold in the market. The need for potable water will be met by purchasing from the city network and a 10-ton water tank will be allocated in the administrative building to store water.

During the maintenance and repair of the turbines within the Project, chemical substances will be employed. The utilized chemical materials will be temporarily stored in dedicated storage areas provided with secondary containment and then sent for disposal through licensed companies. The necessary measures to prevent contamination of surface and underground water sources and avoid soil pollution, and to ensure safe storage of chemicals, are presented in *Chapter 11: Waste and Resources* of this Draft ESIA Report.

During the maintenance and repair processes of the machinery and equipment used in the operation phase of the Project, potentially generated hazardous waste such as contaminated materials (e.g., oily rags, empty lubricating oil containers, used filters from machinery) will be accumulated separately in leak-proof containers labelled with the relevant hazardous waste symbol. All wastes with hazardous characteristics will be stored separately in the hazardous waste storage area. Necessary measures presented for hazardous waste management are presented in *Chapter 11: Waste and Resources* of this Draft ESIA Report.

The social and technical infrastructure needs of the Project personnel during the operational phase of the Project will be met through the planned administrative building. Electricity to run the Administration Building will be supplied from the grid with diesel-fired emergency generators as back-up.

2.6 Analysis of Alternatives

In order to make sure that the goals of the proposed Project have taken into account social, environmental, economic, and technological choices, it is necessary to evaluate different project designs and activity alternatives in accordance with best practises for ESIA Study. During the feasibility stage, the following project alternatives were taken into account:

- No Project Alternative;
- Location Alternatives; and
- Design Alternatives.

2.6.1 No Project Alternative

If the "No Project" scenario is implemented, the expected adverse effects that have been described throughout this ESIA will not be observed. However, these impacts are not anticipated to present high-significance risks, and they can be sufficiently managed by carrying out the proposed mitigation strategies as provided with this ESIA study.

The favourable effects and advantages that the Project's operation will bring about would not happen if the No Project alternative is implemented. These effects and advantages are, such

as; increased utilization of renewable energy resources in Türkiye, minimized dependency on externally generated energy and increased resilience to energy crisis with enhanced energy mix, reduced carbon emissions from national electricity use, reduced dependence on conventional non-renewable energy sources, new opportunities for employment and training in the field of wind and renewable energy and encouraging the use of alternative energy sources in line with national technological, environmental and economic targets, as well as creating opportunities for local technology production.

As a result, the Project's implementation will contribute to the socio-economic and technological development and increased use of renewable energy to feed the Turkish national grid.

2.6.2 Location Alternatives

The selection of the Project Area is important topics for the WPP and alternatives of the Project Area is evaluated various aspects ensure best possible results such as infrastructure availability, environmental and social impact, wind potential and economic feasibility.

In addition, as mentioned in the National EIA, the wind speed should be 7 m/s or above and the capacity factor distribution should be 25% or above for a WPP investment to be economically feasible. In this sense, considering these situations, the selected area meets the necessary standards according to the National EIA (please refer to Section 2.2.2 for details).

Finally, when selecting the Project Area, the areas will be expropriated as little as possible without victimizing the local people are selected. In this way, sustainability for the economic activity on these lands is accomplished, and any financial loss to the landowners due to expropriation is avoided (please refer to Section 2.5.1.2 for details).

2.6.3 Design Alternatives

2.6.3.1 Resource Alternatives

With the Project, electrical energy will be produced from wind power, and it is already considered as an alternative energy compared to power plants with fossil-based energy production. For this reason, no alternative has been determined in terms of energy resources for the Project.

2.6.3.2 Technology Alternatives

During the initial design phase of the Project, it was planned to operate 20 turbines, each with a unit power of 4 MWm/4 MWe, for a total installed capacity of 80 MWm/80 MWe. Although the 4 MWm/4 MWe turbine model was selected in the initial design phase, in line with the wind measurement studies that continued after the production licence was obtained, the unit power of the turbines (with the electrical power remaining the same) was increased to 5.7MWm/5.7Mwe for 13 turbines and to 5.9MWm/5.9Mwe for 1 turbine and the number of turbines was reduced from 20 to 14, with the total installed capacity remaining the same. In this way, both the economic and environmental impacts can be significantly reduced while keeping the total installed capacity constant.

Also, different hub heights have been considered within the scope of the Project. The following criterias are taken into consideration during the selection process of turbine hub heights:

- Effects of increase in hub-heights on efficiency of energy production,
- Permissive restrictions for increase in hub-heights,
- Constructional challenges for increase in hub heights.

3 Policy. Legal and Institutional Framework

3.1 Introduction

This Chapter provides an overview of the national regulatory framework and applicable standards to the Project, which include the following:

- Relevant Turkish environmental, health, safety and social legislation relevant to the nature of the Project,
- Regional and international conventions and agreements applicable to the Project, and
- International requirements and standards.

3.2 National Institutional Framework

The central government entities in Türkiye are set out below:

- The Presidency, including the presidential administrative offices and policy councils
- Turkish Grand National Assembly (TBMM)
- Ministries that create policies and perform compliance assurance functions. The Ministries also contain a number of general directorates and offices, which coordinate and supervise a range of specific activities.

The key national level institutions in Türkiye responsible of managing environmental and social aspects related to the proposed Project include the following:

- Ministry of Energy and Natural Resources (MoENR): MoENR carries out studies to encourage and coordinate studies on the research, development, operation, evaluation, control and protection of energy resources, to monitor and evaluate technological research and development activities on energy, and to identify and evaluate all energy resources, with a priority on the country's renewable energy resources.
  - MoENR General Directorate of Energy Affairs: sets out targets and studies to determine the country's short and long-term needs for energy and natural resources, to help determine the policies necessary for their supply, to assist in determination of general policy principles, to make the necessary investment programs, to prepare plans and projects or to have them prepared, in order to research, operate, develop, evaluate, control and protect energy and natural resources for the benefit of the country, in accordance with technical requirements and economic developments.
- Ministry of Environment, Urbanisation and Climate Change (MoEUCC): The MoEUCC sets principles and policies for protection of environment, monitors and audits implementation, and regulates settlements and environmental protection measures. MoEUCC is also the lead authority for domestic and international climate change policies and the implementation of the relevant strategy and action plan. It is made up of several directorates including the following:
  - MoEUCC General Directorate of EIA, Permit and Inspection: Along with its local governorates, this general directorate is the authority in charge of issuing environmental permits for emissions and discharges, as well as the environmental impact assessment decisions for projects.
  - MoEUCC General Directorate of Spatial Planning: Identifies the procedures and guidelines related to preparation of all kinds of physical spatial development plans and master plans at all scales, approving these plans and ensuring that those plans are implemented and monitored.

  - MoEUCC General Directorate of Environmental Management: This general directorate is the primary authority in environmental protection and monitoring procedures, holding the authority for assessment, supervision and sanctioning in coordination with governorate structures at the local level.
- Ministry of Agriculture and Forestry (MoAF): The MoAF establishes policies on protection and mobilization of the ecological resources in an effective, efficient and sustainable manner through ecological, vegetal and animal added value. Duties of the MoAF also include determining policies on conservation and sustainable use of water resources.
  - MoAF General Directorate of Forestry: Aims to manage forest resources in ecosystem integrity, together with plant and animal existence, taking into account their ecological, economic and socio-cultural benefits, to protect against irregular interventions, natural disasters, fires, to increase forest areas and services related to forests as well as to develop and rehabilitate the forest areas.
- Ministry of Labour and Social Security (MoLSS): The Ministry is responsible for labour and social security affairs, including coordination and monitoring of all aspects associated with occupational health and safety.
- Ministry of Culture and Tourism (MoCT): The Ministry is responsible for research, development, protection, preserving, evaluation, dissemination, promoting and adopting national, spiritual, historical, cultural and touristic values and thereby contribute to the strengthening of national integrity and economic development.
  - General Directorate of Cultural Heritage and Museums: Aims to ensure that movable and immovable cultural assets that need to be protected in Türkiye are revealed, protected, evaluated and promoted through archaeological research and excavations, and to take measures to prevent their destruction and smuggling.

Administratively, Türkiye is divided into a total of 81 provinces, which are further subdivided into administrative districts that may cover both rural and urban areas, of which there are 973 in total. The local level government entities include the following listed:

- Governorates: Each of the 81 provinces in Türkiye is administered by a governor appointed by the President. As the chief executive of the province and principal agent of the central government, each governor supervises other government officials assigned to carry out ministerial functions in his/her province. Each district is administered by an appointed sub-governor, who report directly to the governor and is responsible for a number of directorates including, amongst others; education, health, population, and security, which in turn are closely linked to the ministries of central government.
- Municipalities: All districts have municipalities, headed by an elected mayor, who administers a defined municipality area. The major services for which municipalities are responsible include urban planning, management of transportation systems, construction and maintenance of urban roadways and paths, and provision of water, sewerage and utility services, as well as waste collection/disposal.
- Mukhtars: The lowest level of government is the villages and neighbourhoods, headed by elected mukhtars taking care of specific administrative matters. The mukhtars are elected through local elections for five-year terms.

3.2.1 National Regulatory Framework

3.2.1.1 Legislative Framework

The Environmental Law No. 2872 is Türkiye's primary framework for environmental legislation and is supported by a series of laws, regulations, and communiques. It lays out the main responsibilities and requirements of the institutional authorities and the businesses regarding protection and preservation of the environment.

Labour, health and safety issues are collectively ruled by the Labour Law No. 4857, Occupational Health and Safety Law No. 6331 and related regulations. The main purpose of these laws is to regulate the employer's and the employee's duties, powers, responsibilities, work related rights, working conditions and obligations to provide occupational health and safety at work environment and improve the health and safety conditions.

According to the National EIA Report, in terms of installed power and the number of turbines, the Project is reported to be within the scope of Environmental Impact Assessment Regulation Annex-1 "Article 41-Wind power plants". The ETL to be constructed within the scope of the Project is subject to "Environmental Impact Assessment Regulation Annex-2" according to the Final Project Information Document (PID) will be prepared for the ETL project.

3.2.1.2 Applicable Legislation

The ESIA study is performed in accordance with the applicable national and international legislation as well as international standards for the Project.

According to the national laws and regulations the Project Company is required to secure certain permits and licenses prior to starting the active work on site. The list of laws and regulations applicable for the initial stage of the Project while gaining the development consent is provided in Table 3.1.

Table 3.1: National Legislation Applicable for the initial stage of the Project [22]

Law/Regulation	Official Gazette (OG) date	OG number
Environmental Legislation		
Environmental Law (2872)	11.08.1983	18132
Regulation on Environmental Impact Assessment	29.07.2022	31907
Forest Law (6831)	08.09.1956	9402
Regulation on Implementation of the Article 17 Particle 3 of the Forest Law	30.11.2021	31675
Regulation on Implementation of the Article 18 of the Forest Law	30.11.2021	31675
Road Traffic Regulation	18.07.1997	23053
Legislation related to Land Acquisition		
Law on Expropriation (2942)	08.11.1983	18215
Zoning Law (3194)	09.05.1985	18749
Regulation on Immovable Property Transactions Carried Out by the Energy Market Regulatory Authority	02.11.2021	31647
Regulation Concerning Exploitation of Trees and Shrubs on Private-registered Immovables not Regarded as Forest	10.12.2020	31330
Law on the Use of Renewable Energy Resources for Electricity Production (5346)	18.05.2005	25819
Regulation on Renewable Energy Resource Guarantee Certificate in the Electricity Market	14.11.2020	31304
Regulation on Technical Evaluation of Wind-Based Electricity Generation Applications	20.10.2015	29508
Notification on Wind and Solar Measurements Applications for Pre-License Applications Regarding Wind and Solar Energy	17.06.2014	29033
Electricity Market License Regulation	02.11.2013	28809
Electrical Facilities Project Regulation	30.12.2014	29221
Mining Law (3213)	15.06.1985	18785

[22] This table includes the up-to-date revisions of the documents as of 03 June 2024.

Law/Regulation	Official Gazette (OG) date	OG number
Mining Regulation	11.12.2022	32040
Road Transport Regulation	08.01.2018	30295

There are certain laws and regulations required to be followed during the construction and operation phase of the Project. These laws and regulations set the limits for certain parameters and actions for the management of environmental, health and safety and social issues and biodiversity conservation including waste management, water and wastewater management, air management and noise management, site safety and worker safety and stakeholder engagement. The great majority of the laws and regulations are applicable for both phases of the Project whereas some of them are applicable either construction or operation phase of the project. The detailed list is provided in Table 3.2.

Table 3.2: National Legislation Applicable for each phase of the Project [23]

Law/Regulation	Official Gazette (OG) date	OG number
Laws and Regulations applicable to construction phase of the Project		
Regulation on Control of Excavation, Construction and Demolition Waste	18.03.2004	25406
Regulation on Occupational Health and Safety in Construction Works	05.10.2013	28786
Regulation on the Control of Dust Emissions	05.11.2013	28812
Regulation on Control of Industrial Air Pollution	03.07.2009	27277
Laws and Regulations applicable to operation phase of the Project		
Regulation on Environmental Permit and License	10.09.2014	29115
Workplace Opening and Permit Regulation	10.08.2005	25902
Laws and Regulations applicable to construction and operation phases of the Project		
Environmental Legislation		
Environmental Law (2872)	11.08.1983	18132
Regulation on Environmental Audit	12.06.2021	31509
Environmental Noise Control Regulation	30.11.2022	32029
Soil Conservation and Land Use Law (5403)	19/7/2005	25880
Regulation on Soil Pollution Control and Point-Source Contaminated Sites	08.06.2010	27605
Regulation on Water for Human Consumption	17.02.2005	25730
Regulation on the Protection of Drinking Water Basins	28.10.2017	30224
Surface Water Quality Regulation	30.11.2012	28483
Regulation on the Quality and Treatment of Drinking Water Supply	06.07.2019	30823
Water Pollution Control Regulation	31.12.2004	25687
Regulation on Control of Pollution Caused by Hazardous Substances in Aquatic Environment (76/464/AB)	26.11.2005	26005
Law on Groundwaters (167)	23/12/1960	10688
State Hydraulic Works (DSI) Groundwater Technical Regulation	23.06.1972	14224
Regulation on the Protection of Groundwater against Pollution and Deterioration	07.04.2012	28257
Flood and Sediment Control Regulation	03.05.2019	30763
Regulation on the Protection of Wetlands	04.04.2014	28962
Regulation on Assessment and Management of Air Quality	06.06.2008	26989

[23] This table includes the up-to-date revisions of the documents as of 03 June 2024.

Law/Regulation	Official Gazette (OG) date	OG number
Regulation on Monitoring of Greenhouse Gas Emissions	17.05.2014	29003
Regulation on Waste Management	02.04.2015	29314
Regulation on Zero Waste	12.07.2019	30829
Regulation on Control of Waste Oils	21.12.2019	30985
Regulation on Control of Packaging Waste	26.06.2021	31523
Regulation on the Control of End-of-life Tires	25.11.2006	26357
Regulation on Control of End-of-Life Vehicles	30.12.2009	27448
Regulation on Control of Waste Vegetable Oils	06.06.2015	29378
Regulation on Control of the Waste Batteries and Accumulators	31.08.2004	25569
Regulation on Control of Waste Electrical and Electronic Appliances	26.12.2022	32055
Regulation on Control of Medical Waste	25.01.2017	29959
Legislation related to Health and Safety, Labour Practices		
Labour Law (4857)	10.06.2003	25134
Law on Trade Union and Collective Bargaining (6356)	18.10.2012	28460
Regulation on Working Duration Related to Labour Law	06.04.2004	25425
Regulation on Excess Work and Work in Excess Periods related to Labour Law	06.04.2004	25425
Regulation on Special Principles in Works Carried out by Employing Workers in Shifts	07.04.2004	25426
Regulation on Minimum Wage	01.08.2004	25540
Regulation on Suspension of Work in Workplaces	01.08.2004	28603
Regulation on Contractors and Subcontractors	27.09.2008	27010
Occupational Health and Safety Law (6331)	30.06.2012	28339
Occupational Health and Safety Services Regulation	29.12.2012	28512
First Aid Regulation	29.07.2015	29429
Regulation on Use of Personal Protective Equipment in Workplaces	02.07.2013	28695
Regulation on the Procedures and Principles of the Employee's Health and Safety Trainings	15.05.2013	28648
Regulation on Occupational Health and Safety Committees	18.01.2013	28532
Regulation on Occupational Health and Safety Risk Assessment	29.12.2012	28512
Regulation on Duties, Authority, Responsibilities and Trainings of Occupational Health and Safety Specialists	29.12.2012	28512
Regulation on Duties, Authority, Responsibilities and Trainings of Workplace Doctor and Other Health Personnel	20.07.2013	28713
Regulation on the Health and Safety Measures to be taken in Workplace Buildings and Additions	17.07.2013	28710
Regulation on Occupational Health and Safety in Temporary or Fixed Term Employment	23.08.2013	28744
Regulation on Environmental Noise Emission Generated by the Outdoor Equipment Used at Site	30.12.2006	26392
Regulation on the Protection of the Workers against Risks Relevant to Noise	28.07.2013	28721
Regulation on the Protection of the Workers against Vibration Risks	22.08.2013	28743
Exhaust Gas Emission Control Regulation	11.03.2017	30004
Türkiye Earthquake Regulation for Buildings	18.03.2018	30364
Regulation on the Emergency Situations in Workplaces	18.06.2013	28681
Regulation on Protection of Buildings from Fire	19.12.2007	26735

Law/Regulation	Official Gazette (OG) date	OG number
Law on People with Disabilities (5378)	07.07.2005	25868
Regulation on Accessibility Monitoring and Auditing	20.07.2013	28713
Regulation on Safety and Health Signs	11.09.2013	28762
Regulation on Manual Handling	24.07.2013	28717
Regulation on the Protection of Workers from the Dangers of the Explosive Media	30.04.2013	28633
Regulation on Health and Safety Measures in Working with Chemical Substances	12.08.2013	28733
Regulation on Health and Safety Measures for Working with Carcinogenic and Mutagenic Substances	06.08.2013	28730
Regulation on the Works in Which Workers shall Work Maximum Seven and Half Hours or Less in a Day in Terms of Health Rules	16.07.2013	28709
Legislation related to Stakeholder Engagement and Grievance Mechanism		
Law on Right to Information (4982)	24.10.2003	25269
Law on Preservation of Personal Data (6698)	07.04.2016	29677
Regulation on the Principles and Procedures for Enforcement of the Law on the Right to Information	27.04.2004	25445
Law on Use of the Right to Petition (3071)	10.11.1984	18571
Legislation related to Biodiversity Conservation		
Law on Natural Parks	11.08.1983	18132
Terrestrial Hunting Law (4915)	11.07.2003	25165
Law on Animal Protection	01.07.2004	25509
Forestry Law	08.09.1956	9402
Law on Pasture	28.02.1998	23272
Law on Fisheries	04.04.1971	13799
Pastureland Regulation	31.07.1998	23419
Regulation on Protection of Wildlife and Wildlife Development Areas	08.11.2004	25637
Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora	27.12.2001	24623
Regulation on Collection, Protection and Usage of Plant Genetic Resources	19.07.2012	28358
Legislation related to Cultural Heritage		
Law on the Conservation of Cultural and Natural Assets (2863)	23.07.1983	18113
Regulation on Detection and Registration of Immovable Cultural Assets and Sites That Need to be Protected	13.03.2012	28232
Legislation related to Energy		
Electrical High Current Facilities Regulation	30.11.2000	24246
Local Mechanical Parts Regulation	28.05.2021	31494
Regulation on Grounding in Electrical Installations	21.08.2001	24500

Source: Republic of Türkiye Legislation Information System. Accessed from www.mevzuat.gov.tr.

3.2.2 National Strategy Documents

In addition to laws and regulations, Türkiye has prepared several strategy and action plans for sustainable development, environmental and ecological protection, and energy transition. The following plans and strategy documents will be taken into consideration during the ESIA studies for the Project:

- Türkiye National Energy Plan (2022)

- Climate Change Action Plan (2012)
- National Forestry Program (2004)
- Turkish National Action Plan against Desertification (2015)
- National Biological Diversity Strategy and Action Plan (2019)
- National Rural Development Strategy (2015)
- National Plan on on-site Protection of Plant Genetic Diversity (1998)

3.3 International Requirements and Guidelines

The works within the scope of the Project are designated to be implemented primarily in accordance with the IFC standards. The international E&S standards, requirements, standards and guidelines applicable to this ESIA study are listed below:

- IFC's Environmental and Social Policy & Performance Standards (2012)
- Equator Principles IV (2020)
- EBRD's Environmental and Social Policy & Performance Requirements (2019)
- U.S. International Development Finance Corporation (DFC)'s Environmental and Social Policy and Procedures (2020)
- OECD Recommendation of the Council on Common Approaches on the Environment and Officially Supported Export Credits – "The Common Approaches"
- IFC/EBRD's Guidance Note on Workers Accommodation: Processes and Standards (2009)
- IFC//EBRD Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries - Good Practice Handbook (2023)
- ILO's fundamental conventions concerning the abolition of child labour, the elimination of discrimination at the workplace and forced/compulsory labour
- IFC's Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC's Environmental, Health and Safety (EHS) Guidelines for Electric Power Transmission and Distribution (2007)
- IFC's Environmental, Health and Safety (EHS) Guidelines for Wind Energy (2015)
- European Commission's Guidance Document on Wind Energy Developments and EU Nature Legislation (2020)
- European Union (EU) Environmental, Social, Occupational Health and Safety Directives including but not limited to:
  - EU Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU),
  - EU Council Directive 2008/98/EC (Waste Framework Directive) on waste and repealing certain Directives (2008),
  - EU Council Directive 89/391/EEC (The OHS Framework Directive) on the introduction of measures to encourage improvements in the safety and health of workers at work (1989),
  - EU Environmental Noise Directive (END) (i.e., Directive 2002/49/EC relating to the assessment and management of environmental noise),
  - EU Taxonomy definition and overall Do No Significant Harm concepts
- International Standardisation Organisation Standards (e.g., ISO 14001, ISO 45001, ISO 9001)
- International Electrotechnical Commission (IEC) IEC 61400-1:2019 Wind Energy Generation Systems Standard
- International best practice regarding the mitigation of impacts and consideration of minorities and vulnerable persons

- Applicable industry safety guidance
- Good International Industry Practices (GIIPs)

3.3.1 IFC Performance Standards (PSs)

The IFC Performance Standards (PSs) are listed below, and their relevance with the Project is detailed in Table 3.3.

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

Table 3.3: IFC PSs and Their Relevance to the Project

Performance Standard	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	PS 1 emphasizes on the importance of: (i) an integrated assessment to identify the environmental and social impacts, risks and opportunities of the project; (ii) effective community and stakeholder engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of social and environmental performance throughout the life of the project through management programs, monitoring, and review.	Yes	Chapters 13,17, and 18
PS 2: Labour and Working Conditions	PS 2 recognises that a balance between economic growth and workers' fundamental rights is needed. The objectives are: (i) to promote a non-discriminative, equal working environment for workers; (ii) to maintain and improve the worker-management relationship; (iii) to ensure compliance with national labour and employment laws; (iv) to protect vulnerable workers; to promote a safe and healthy working environment and the health of workers; lastly, (v) to protect the workforce by addressing child labour and forced labour.	Yes	Chapter 13 and Chapter 14
PS 3: Resource Efficiency and Pollution Prevention	PS 3 emphasizes that increasing economic activity and urbanisation may result in increased levels of pollution to air, water, and land, and consume limited resources of the Earth; of which may threaten humans and the environment at the local, regional, and global levels. The main objectives are: (i) to avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities; (ii) to promote more sustainable use of resources including energy	Yes	Chapters 5, 6, 7, 8, 9, 10, 11, 15 and 16

Performance Standard	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
	and water; and (iii) to reduce project-related greenhouse gas (GHG) emissions that contribute to climate change.		
PS 4: Community Health, Safety, and Security	PS 4 recognises that project activities, equipment, and infrastructure may increase the vulnerability of communities to risks and impacts. The objectives are: (i) to anticipate and avoid adverse impacts on the health and safety of the affected community during the project life cycle; and (ii) to ensure that the safeguarding of personnel and property is carried out for the avoidance from or minimisation of risks to the affected communities.	Yes	Chapter 15
PS 5: Land Acquisition and Involuntary Resettlement	PS 5 recognises that project-related land acquisition and restrictions on land use may have adverse impacts on communities and persons who use this land. The objectives are: (i) to avoid or minimise involuntary resettlement wherever feasible by composing alternative project designs; (ii) to avoid or minimise adverse social and economic impacts of land acquisition by providing compensation for loss of assets and ensuring that resettlement activities are implemented with appropriate consultation and disclosure; lastly, (iii) to improve or at least restore the livelihoods and living conditions of displaced communities.	Yes	Chapter 13 and Chapter 18
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are key pillars for ensuring sustainable development. The objectives are: (i) to protect and conserve biodiversity; maintain the benefits from ecosystem services; and (ii) to promote sustainably managed and used natural resources through best practices that integrate conservation and development priorities.	Yes	Chapter 12
PS 7: Indigenous Peoples	PS 7 recognizes that Indigenous Peoples are more likely to become vulnerable to risks and impacts related to project operations. The main objectives are: (i) to anticipate and avoid, minimise or compensate adverse impacts of the project on Indigenous Peoples; (ii) to promote possible sustainable development benefits and opportunities; (iii) to establish and maintain an ongoing relationship with affected Indigenous Peoples throughout the life-cycle of the project; (iv) to ensure free, prior and informed consent of Indigenous Peoples; lastly, (v) to respect and preserve their culture, knowledge and practices.	No[24]	-
PS 8: Cultural Heritage	PS 8 recognises the significance of cultural heritage for current and future generations. The main two objectives are: (i) to protect the cultural heritage from the possible adverse impacts of project activities and support its	Yes	Chapter 16

[24] There are no identified indigenous people communities in Türkiye.

Performance Standard	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
	preservation; and (ii) to promote equitable sharing of benefits from cultural heritage.		

Source: International Finance Corporation (IFC). (2012). *Performance Standards on Environmental and Social Sustainability*. https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standards-en.pdf

3.3.2 The Equator Principles (EP IV)

The Equator Principles are intended to serve as a common baseline and framework for financial institutions, namely Equator Principles Financial Institutions (EPFIs), to identify, assess and manage environmental and social risks when financing projects.

The Project compliance will be assessed upon the ten Equator Principles, which are listed below. Relevance of the Principles with the Project is detailed in Table 3.4.

- Principle 1: Review and Categorisation
- Principle 2: Environmental and Social Assessment
- Principle 3: Applicable Environmental and Social Standards
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan
- Principle 5: Stakeholder Engagement
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review
- Principle 8: Covenants
- Principle 9: Independent Monitoring and Reporting
- Principle 10: Reporting and Transparency

Table 3.4: Equator Principles and Their Relevance to the Project

Equator Principles	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
Principle 1: Review and Categorisation[25]	According to Principle 1, the project is categorised based on the magnitude of its potential environmental and social risks and impacts, including those related to Human Rights, climate change, and biodiversity. Such categorisation is based on the International Finance Corporation's (IFC) environmental and social categorisation process.	Yes	The Project is confirmed as Category B by the Lenders.
Principle 2: Environmental and Social Assessment	Principle 2 requires performing a process to address the relevant environmental and social risks and scale of impacts of the project. The assessment is expected to propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to workers, Affected Communities, and the environment. Principle 2 also expects that assessments of potential adverse Human	Yes	Chapters 5-17

[25] **Category A:** Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.

Equator Principles	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
	Rights impacts and climate change risks are included as part of the ESIA.		
Principle 3: Applicable Environmental and Social Standards	Principle 4 requires that compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues are addressed within the assessment. Principle 4 notes that the EPFI will evaluate the Project's compliance with the applicable standards; (i) for Projects located in Non-Designated Countries[26], compliance with the applicable IFC PSs and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines)., and (ii) for projects located in Designated Countries[27], compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	Yes	Chapter 3
Principle 4: Environmental and Social Management System and Equator Principles Action Plan	Principle 4 recognizes that for all Category A and Category B Projects, the EPFI will require the client to develop and / or maintain an Environmental and Social Management System (ESMS). Principle 4 requires that an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the principle requires the client and the EPFI to agree to an Equator Principles Action Plan (EPAP).	Yes	ESMP and ESMS Plans and Procedures
Principle 5: Stakeholder Engagement	Principle 5 recognizes that for all Category A and Category B Projects the EPFI will require the client to demonstrate effective Stakeholder Engagement, as an ongoing process in a structured and culturally appropriate manner, with Affected Communities, Workers and, where relevant, Other Stakeholders. For projects with potentially significant adverse impacts on Affected Communities, the principle requires performing an Informed Consultation and Participation process. The client is expected to tailor its consultation process to: (i) the risks and impacts of the project; (ii) the project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and (iii) the needs of disadvantaged and vulnerable groups.	Yes	Chapter 13 and SEP
Principle 6: Grievance Mechanism	Principle 6 recognizes that for all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and workers, as appropriate, to receive and facilitate resolution of concerns and	Yes	

[26] Non-Designated Countries are those countries not found on the list of Designated Countries on the Equator Principles Association website.

[27] Designated Countries are those countries deemed to have robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural environment.

Equator Principles	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
	grievances about the project's environmental and social performance.		
Principle 7: Independent Review	For all Category A and, as appropriate, Category B Projects, Principle 7 requires that an Independent Environmental and Social Consultant to carry out an Independent Review of the Assessment process including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation.	Yes	
Principle 8: Covenants	Principle 8 recognizes that for all projects, where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance.	Yes	
Principle 9: Independent Monitoring and Reporting	Principle 9 recognizes that for all Category A and, as appropriate, Category B Projects, in order to assess Project compliance with the EP4, the EPFI will require independent monitoring and reporting.	Yes	
Principle 10: Reporting and Transparency	Principle 10 requires the client to prepare the following: (i) A summary of the ESIA is accessible and available online and that it includes a summary of human rights and climate change risks and impacts when relevant; (ii) Annual GHG emission reporting (combined Scope 1 and Scope 2 Emissions, and, if appropriate, the GHG efficiency ratio) during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually; (iii) Sharing of non-sensitive Project-specific biodiversity data with the Global Biodiversity Information Facility (GBIF) and relevant national and global data repositories, using formats and conditions to enable such data to be accessed and re-used in future decisions and research applications.	Yes	

Source: Equator Principles. (2020). *The Equator Principles*. https://equator-principles.com/app/uploads/The-Equator-Principles_EP4_July2020.pdf

3.3.3 EBRD Performance Requirements (PRs)

There are ten identified performance requirements within the 2019 Environmental and Social Policy of EBRD. Each PR and their applicability condition to the Project is determined in Table 3.5.

Table 3.5: EBRD PRs Applicable to the Project

Performance Requirement	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
PR 1: Assessment and Management of Environmental and Social Risks and Impacts	PR 1 emphasizes on the significance of integrated assessment to identify the environmental and social impacts and issues associated with the project and the client's management of environmental and social performance throughout the life cycle of the project.	Yes	Chapters 5 - 17

Performance Requirement	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
PR 2: Labour and Working Conditions	PR 2 recognises that workforce is a valuable asset for the client and its business activities, and that effective human resources management and a reliable worker-management relationship based on respect for workers' rights, including freedom of association and right to collective bargaining, are key pillars for ensuring the sustainability of business activities.	Yes	Chapter 13 and Chapter 14
PR 3: Resource Efficiency and Pollution Prevention and Control	PR 3 emphasizes on the importance of a holistic approach to climate impacts and greenhouse emissions, resource management and pollution prevention and control regarding the project operations. The project related risks and impacts associated with resource use, and the generation of waste and emissions need to be assessed in the context of project location and local environmental conditions. Appropriate mitigation measures, best available techniques (BATs) and GIIP should be adopted for efficient and effective resource use, pollution prevention and control and avoidance, minimisation, and reduction of greenhouse gases (GHG) emissions. PR 3 also recognises the emerging concept and practice of Circular Economy and recovery of resources to generate value from products that is viewed as waste in a linear economy.	Yes	Chapters 5, 6, 7, 8, 9, 10, 11, 15 and 16
PR 4: Health, Safety and Security	PR 4 recognises the significance of managing health, safety, and security risks (including project-related gender-based violence risks of sexual harassment, sexual exploitation and abuse) to workers, project-affected communities and consumers associated with project activities, by performing a risk control hierarchy.	Yes	Chapter 14 and Chapter 15
PR 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	PR 5 addresses impacts of project-related land acquisition, including restrictions on land use and access to assets and natural resources, which may result in physical displacement (relocation, loss of land or shelter), and/ or economic displacement (loss of land, assets or restrictions on land use, assets and natural resources leading to loss of income sources or other means of livelihood). Involuntary resettlement refers to both these impacts and the processes of mitigating to and compensating these impacts.	Yes	Chapter 13 and Chapter 18
PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	PR 6 recognises that the conservation of biodiversity and sustainable management of living natural resources are crucial for ensuring environmental and social sustainability.	Yes	Chapter 12
PR 7: Indigenous Peoples	PR 7 recognises that indigenous peoples may be among the most vulnerable segments of the population. Their economic, social and legal status may limit their capacity to defend their rights to and interest in lands and resources (both natural and cultural). This, combined with their economic and spiritual dependence on	No[28]	-

[28] There are no identified indigenous people communities in Türkiye.

Performance Requirement	Scope and Triggers	Potentially Applicable to the Project?	Relevant Chapter within ESIA Report
	these lands and resources, could make them particularly susceptible to any adverse effects of project operations. PR 7 also recognises that projects can create opportunities for Indigenous Peoples to participate in and benefit from project-related activities that may help them fulfil their aspiration for economic and social development.		
PR 8: Cultural Heritage	PR 8 recognises the significance of cultural heritage for present and future generations. The aim is to protect cultural heritage while guiding the client to avoid or mitigate adverse impacts on cultural heritage in the course of its business operations.	Yes	Chapter 16
PR 9: Financial Intermediaries	PR 9 recognises that financial intermediaries (FIs) are a key instrument for promoting sustainable financial markets and provide a vehicle to channel funding to the micro, small and medium-sized enterprise (SME) sector. FIs are engaged in a wide range of activities, such as microfinance, SME lending, trade finance, largescale infrastructure finance, medium to long-term corporate or project finance, and housing finance.	No[29]	-
PR 10: Information Disclosure and Stakeholder Engagement	PR 10 recognises the significance of a transparent engagement with relevant stakeholders (especially those defined as vulnerable groups within the scope of the project) and disclose appropriate project information throughout the lifetime of the project. Providing an accessible grievance mechanism as a part of the stakeholder engagement is crucial for building strong, constructive, and responsive relationships which are essential for a successful environmental and social impacts management within the Project.	Yes	Chapter 18 and SEP

3.3.4 WBG Environmental, Health and Safety (EHS) Guidelines

The Environmental, Health, and Safety (EHS) Guidelines of the World Bank Group (WBG) are technical reference documents that cover general and industry-specific examples of GIIP. The General EHS guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance on EHS issues in specific industry sectors.

In accordance with the nature and scope of the Project activities; together with the General EHS Guidelines, the Project is expected to be compliant with the EHS Guidelines for Wind Energy and the EHS Guidelines for Electric Power Transmission and Distribution.

3.3.4.1 EHS Guidelines for Wind Energy

The EHS Guidelines for Wind Energy cover information regarding the environmental, health and safety conditions to be focused on for the wind energy facilities. The guidelines provide an overview of possible risks and impacts of wind energy facilities and relevant mitigation measures and performance indicators to be considered on EHS related issues as listed below:

[29] The project does not use financial intermediaries.

- Environment
  - Landscape and visual impacts,
  - Noise,
  - Biodiversity,
  - Shadow flicker,
  - Water quality,
- Occupational Health and Safety
  - Working at Height and Protection from Falling Objects,
  - Working over Water (for offshore facilities),
  - Working in Remote Locations,
  - Lifting Operations,
- Community Health and Safety
  - Blade/Ice Throw,
  - Aviation,
  - Electromagnetic Interference,
  - Public Access,
  - Abnormal Load Transportation.

The ESIA study to be performed will assess the possible impacts that may arise due to each of the listed EHS issues related with onshore wind energy facilities; and put forth necessary mitigation measures reliant with the performance indicators covered in the subject guidelines.

3.3.4.2 EHS Guidelines for Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution provide information related with power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. The guidelines focus on risks and impacts that may arise during the construction of power transmission and distribution projects and present mitigation measures and performance indicators regarding environment (i.e., terrestrial habitat alteration, aquatic habitat alteration, electric and magnetic fields, and hazardous materials), OHS (i.e., live power lines, working at height, electric and magnetic fields, and exposure to chemicals), and community health and safety (i.e., electrocution, visual amenity, electromagnetic interference, noise and ozone, and aircraft navigation and safety) related issues.

3.3.5 Regional and International Conventions and Agreements

Regional and international conventions and protocols related with the scope of the Project are provided in Table 3.6.

Table 3.6: International Legislation Relevant to the Project

Topic	Convention/Legislation
International Conventions and Standards	International Organisation for Standardisation (ISO) Standards: ISO 14001:2015 Environment, ISO 9001:2015 Quality, ISO 45001:2018 Occupational Health and Safety, ISO 50001 Energy Management System, ISO 10002:2018 Customer Satisfaction, ISO 27001:2013 Information Security, ICS 27.10 Wind Turbine Energy Systems Standard Family **Labour Practices** International Labour Organisation (ILO) Convention No.81 On Labour Inspection in Industry and Commerce (1947)

Topic	Convention/Legislation
	ILO Convention No.161, On Occupational Health Services (1985) ILO Convention No.167, Safety and Health in Construction (1988) World Health Organization (WHO) International Commission on Non- Ionizing Radiation Protection (ICNIRP) **Biodiversity Conservation** Convention on Biological Diversity (CBD), ratified in 1996 by Türkiye Bern Convention on Protection of Europe's Wildlife and Living Environment (acceded by the Decision of the Council of Ministers dated 9 January 1984 and published in the Turkish Official Gazette dated 20 February 1984 and no. 18318) CITES Convention on Trade in Endangered Species of Wild Flora and Fauna, Türkiye has acceded in 1996 International Union for the Conservation of Nature (IUCN) list of threatened species (the IUCN Red List) Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) (1979) The Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR) (1994), Türkiye has acceded in 1994 The European Landscape Convention (Florence, 2000), Türkiye has been a signatory since October 2000
Türkiye ratified the following ten fundamental conventions of the International Labour Organization	C029 - Forced Labour Convention, 1930 (No. 29), ratified on 30 October 1998 C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) ratified on 12 July 1993 C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98), ratified on 23 January 1952 C100 - Equal Remuneration Convention, 1951 (No. 100) ratified on 19 July 1967 C105 - Abolition of Forced Labour Convention, 1957 (No. 105), ratified on 29 March 1961 C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111), ratified on 19 July 1967 C138 - Minimum Age Convention, 1973 (No. 138), ratified on 30 October 1998 C155 – Occupational Safety and Health Convention, 1981 (No. 155), ratified on 22 April 2005 C182 - Worst Forms of Child Labour Convention, 1999 (No. 182), ratified on 02 August 2001 C187 – Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187), ratified on 16 January 2014
UN Conventions and agreements ratified by Türkiye	Environmental Protection and the Climate Change: Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) (2016), ratified on 6 October 2021 Kyoto Protocol of the UNFCCC (1997), ratified on 28 May 2009 Vienna Convention for the Protection of Ozone Layer (1985) and the Montreal Protocol on Substances that Deplete the Ozone Layer (1987) **Biodiversity Conservation:** The UN Convention on Biological Diversity (1997), ratified by Türkiye Cultural Heritage: United Nations Educational, Scientific, and Cultural Organisation (UNESCO), Convention on the Protection and Promotion of the Diversity of Cultural Expressions. Paris, 20 October 2005 UNESCO, Convention for the Safeguarding of the Intangible Cultural Heritage. Paris, 17 October 2003 UNESCO, Convention concerning the Protection of the World Cultural and Natural Heritage. Paris, 16 November 1972 UNESCO, Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property. Paris, 14 November 1970 Human Rights:

Topic	Convention/Legislation
	International Convention on the Elimination of All Forms of Racial Discrimination, ratified in 2002
	International Covenant on Civil and Political Rights, ratified in 2003
	Optional Protocol to the International Covenant on Civil and Political Rights, ratified in 2006
	International Covenant on Economic, Social and Cultural Rights, ratified in 2003
	Convention on the Elimination of All Forms of Discrimination against Women, ratified in 1985
	Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women, ratified in 2002
	Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment, ratified in 1988
	Optional Protocol of the Convention against Torture, ratified in 2011
	Convention on the Rights of the Child, ratified in 1995
	Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict, ratified in 2004
	Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography, ratified in 2002
	CRPD Convention on the Rights of Persons with Disabilities, ratified in 2017
	International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families, ratified in 2004
	Convention on the Rights of Persons with Disabilities, ratified in 2009
	Optional Protocol to the Convention on the Rights of Persons with Disabilities, ratified in 2015

4 ESIA Scope and Methodology

4.1 Introduction

This chapter presents details of ESIA Report's scope, methodology and the basis of the assessments that are presented in this ESIA.

4.2 ESIA Objective

The objectives of the ESIA are; to be compliant with applicable national laws and the IFC's Sustainability Policy and PSs, EBRD Environmental and Social Policy (ESP) and PRs, and the Equator Principles IV; to identify and assess the severity of potential impacts on receptors and identified resources; to develop and describe mitigation measures that will be taken to prevent or minimize any potential negative effects and maximize the potential benefits; and to communicate the severity of residual impacts that will remain once the applied mitigation.

4.3 ESIA Screening

Lenders have been evaluating the categorization of the Project in line with their respective Environmental and Social Policies. Based on the numbers of people affected by land acquisition, project location in the internationally protected Key Biodiversity Area, project-related noise, air, visual environment and other potential cumulative impacts, and presence of high-risk activities such as blasting activities. The final decision regarding categorization of the Project has not yet been shared with the Consultant while preparation of this Draft ESIA Report. The decision will be shared in the Final Draft ESIA Report upon the up-to-date information provided by the Project Company.

The first stage of the ESIA process is screening the current conditions to identify whether an ESIA study needs to be conducted for the proposed project. This stage is mostly determined through the lender's categorization patterns in accordance with the Project scale and activities. The ESIA study is required to be conducted.

4.4 ESIA Scoping

4.4.1 Technical Assessment

An ESIA Scoping report was prepared and submitted to the Project Company. This document reviewed the known baseline at the Project site and identified the potentially significant effects that could be realised for a range of topics during both the construction and operation phases. This formed the basis of the proposed scope of the ESIA. The Scoping Report also outlines the proposed methodologies that have subsequently been followed during preparation of this ESIA.

The confirmed scope of the ESIA is as follows:

Table 4.1: Agreed Scope of the ESIA

Impact/Aspect	Construction Phase	Operation Phase	Justification for scoping out (if applicable)
Physical Environment			
Water Quality, Hydrology and Hydrogeology	Scope in	Scope out	Scoped out since no significant impact on water sources is anticipated from operation phase activities
Geology and Soils	Scope in	Scope out	Scoped out since the operation phase activities are not anticipated to result in significant earthworks.
Climate Change	Scope in	Scope in	-
Air Quality	Scope in	Scope out	Scoped out since no significant impact on the ambient air quality is expected due to operation of the WPP as there will be no emission in question. There will be minor emissions from the vehicles during the operation; nevertheless, no significant impact is foreseen.
Greenhouse Gases	Scope in	Scope in	-
Noise and Vibration	Scope in	Scope in	-
Shadow Flicker	Scope out	Scope in	Shadow flicker is an impact associated with only the operation phase of the wind power plants. Therefore, it is scoped out during construction phase.
Waste and Resources	Scope in	Scope in	-
Traffic and Transport	Scope in	Scope out	Scoped out since no significant impact on the traffic load is expected due to the operation activities of the WPP as there will not be major vehicle movement in question. There will be minor activities of the Project vehicles during operation; nevertheless, no significant impact is foreseen.
Landscape and Visual	Scope out	Scope in	Visual impacts are expected to be caused by land clearing, excavation, stockpiling of equipment and materials, the use of construction equipment, and the construction of the turbines and transmission line elements. However, given the temporary nature of these elements and activities, the presence of existing detracting elements in landscape, it is not anticipated that the construction activities will result in significant changes to the existing views. Therefore, scoped out for the construction phase ESIA assessment.
Biodiversity	Scope in	Scope in	-
Social	Scope in	Scope in	-
Archaeology & Cultural Heritage	Scope in	Scope out	Scoped out since no impact is expected regarding cultural heritage during the operation phase. When the activities to be conducted are considered within the operation phase, it is estimated that no other area will be disturbed other than the areas disturbed during the construction phase.

4.4.2 Assessment Scope

In accordance with national and international requirements, the ESIA will consider the following:

- Environmental, social, labour, land acquisition, health, safety and security risks and impacts of the Project;
- Project Components, if any, that are directly part of the Project, but which would not have been constructed or expanded without the Project and are needed for the Project to be viable. This includes reviewing potential cumulative impacts and unplanned but predictable developments caused by the Project that may occur later or at a different location;
- Potential impacts and resulting effects that may arise for each key stage of the Project that can be reasonably assessed at this stage, including pre-construction, construction and operation;
- Potential third-party impacts including supply chain considerations; and
- Identification of beneficial and adverse, direct and indirect as well as cumulative impacts and effects of the Project related to the bio-physical and the socio-economic environment.

Cumulative effects are considered, examining the combination of multiple impacts upon a receptor as a result of multiple effects resulting from the Project, together with other nearby developments (please refer to *Chapter 17: Cumulative Impacts*).

As with the technical assessments, significant effects and appropriate mitigation are identified as part of the assessment of cumulative impacts, building upon the impacts identified in the related technical chapters.

As discussed in *Chapter 2: Project Description*, due to the length of the Project lifetime, the impacts of decommissioning cannot be properly predicted at this stage. As such, it is difficult to produce an accurate and meaningful prediction of the significance of likely impacts and their effects because the baseline conditions are likely to have changed notably by this phase of the Project. This ESIA therefore does not assess the likely impacts that may arise from the decommissioning phase. On the other hand, the Project Company will develop a high level decommissioning strategy and improve it throughout the Project lifetime to develop a detailed decommissioning plan including a full impact assessment and mitigation plan.

Should any decommissioning or refurbishment occur, consultation will be undertaken prior to these activities to appropriately assess likely E&S impacts based on an adapted baseline, to understand if assessments, including ESIA, are required, and to ensure the works conform with necessary local requirements. Assessments would mitigate or enhance these impacts based on mitigation/enhancement measures available and feasible at that time. This action is included in the ESMP and, as such, implements an adaptive environmental management approach with regards to associated likely impacts and their management during the decommissioning phase.

This ESIA is based on the general assumption that baseline conditions are unlikely to change significantly between the commencement of construction and its completion.

4.5 Impact Assessment Process

As informed in the ESIA Scoping Report, the impact assessment methodology is prepared in line with the national and international requirements.

The key steps during the main ESIA phase are to: identify the study area, or area of influence; characterise the existing baseline; determine the impacts that may occur as a result of the construction and operation of the Project; identify how these impacts may affect the baseline conditions; evaluate the significance of the likely effects; and identify mitigation and enhancement measures to reduce any adverse effects and maximise any benefits resulting

from the Project realization. The approach to these stages of the ESIA process is discussed below.

4.6 ESIA Study Area

4.6.1 Project Affected Area

The project affected area (PAA) is defined as the area of land used by the Project permanently or temporarily.

4.6.2 Area of Influence

As defined in IFC PS1, Area of Influence (AoI) encompasses the following, as appropriate:

- The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the Project; (ii) impacts from unplanned but predictable developments caused by the Project that may occur later or at a different location; or (iii) indirect Project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities, which are facilities or activities that are not funded as part of the Project, but which are significant in determining the success of Project or in producing agreed project outcomes. These would not have been constructed or expanded if the project did not exist and without which the Project would not be viable.
- Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

The Area of Influence (AoI) covers all land or water, directly or indirectly impacted by the Project, and therefore extends beyond the Project boundary. This includes communities and areas adjacent to the PAA that may experience impacts during the construction or operation of the Project, despite being located outside of the area in which the Project will be located e.g., air or noise impacts. The AoI is defined on a topic-by-topic basis, as each topic will define its AoI based upon the potential effects.

4.7 Baseline Conditions Consideration

Baseline information has been collated from a range of sources including primary data collection, secondary data collection, publicly available information and through consultation.

Primary data was collected through:

- Site visits
- Stakeholder engagement activities
- Biodiversity studies (Site Reconnaissance Survey)
- Archaeological walkover survey
- Baseline soil and water quality analysis
- Baseline noise monitoring surveys
- Baseline air quality monitoring surveys

Specific surveys are detailed in relevant chapters of this Report. In addition to primary data, baseline data was collected from National EIA documentation, as well as desktop studies of available secondary data including websites and articles and reports from local authorities, ministries, government organisations, civil society organisations, non-governmental

organisations (NGOs), local media, and business groups. Relevant secondary sources used to support the assessment process are referenced in the relevant impact assessment chapters.

4.8 Assessment Methodology

This Draft ESIA Report has definition of impacts that likely cause significant environmental and social effects. For each environmental and social impact, magnitude and the sensitivity are defined. Criteria of the magnitude, sensitivity of a receptor and evaluation matrix are given below.

4.8.1 Magnitude Criteria

The assessment of the magnitude of a change, or impact, resulting from the development is undertaken in two steps. Firstly, the identified impacts are categorised as beneficial or adverse. Secondly, impacts are categorised as major, moderate, minor or negligible based on consideration of parameters such as:

- Scale of the impact – how intense or severe the extent of the impact is likely to be.
- Duration of the impact – ranging from ‘beyond decommissioning’ to ‘temporary with no detectable impact’.
- Spatial extent of the impact – for instance, within the site boundary, within district, regional, national and international.
- Reversibility – ranging from ‘permanent requiring significant intervention to return to baseline’ to ‘no change’.
- Likelihood – ranging from ‘occurring regularly under typical conditions’ to ‘unlikely to occur.
- Compliance with legal standards and established professional criteria - ranging from substantially exceeds national standards and limits / international guidance to meets or exceeds minimum standards or international guidance.

Criteria for determining impact magnitude are given below:

Table 4.2: Criteria for Determining Impact Magnitude

Category	Description (adverse impacts)
Major	Fundamental change to the specific conditions assessed resulting in long term or permanent change, typically widespread in nature and requiring significant intervention to return to baseline; would violate national standards or Good International Industry Practice (GIIP) without mitigation.
Moderate	Detectable change to the specific conditions assessed resulting in non-fundamental temporary or permanent change.
Minor	Detectable but minor change to the specific conditions assessed.
Negligible	No perceptible change to the specific conditions assessed.

4.8.2 Sensitivity Criteria

Sensitivity is specific to each topic and the environmental resource or population affected, with criteria generally defined on basis of baseline information. The sensitivity of a receptor is determined based on review of the population (including proximity / numbers / vulnerability) and presence of features on the site or the surrounding area. Generic criteria for determining sensitivity of receptors are outlined in Table 4.3. Each detailed assessment defined sensitivity in relation to its topic.

Table 4.3: Criteria for determining sensitivity of a receptor

Category	Description
High	Receptor (human, physical or biological) with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.
Medium	Receptor with limited capacity to absorb proposed changes or limited opportunities for mitigation.
Low	Receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation.
Negligible	Receptor with good capacity to absorb proposed changes or and good opportunities for mitigation.

4.8.3 Evaluation of Effects

Likely effects are evaluated through taking into account the interaction between the magnitude of an impact and the sensitivity of a receptor, as presented in the effect evaluation matrix in Table 4.4.

Table 4.4: Effect evaluation matrix

Sensitivity	Magnitude						
	Adverse			Neutral	Beneficial		
	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
High	Major	Major	Moderate	Negligible	Moderate	Major	Major
Medium	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Moderate
Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

4.8.4 Types of Effect

The following types of effect are considered within this ESIA:

- **Direct effects** – effects which could arise from activities which form an integral part of the Project;
- **Indirect effects** – effects which could arise from activities not explicitly forming part of the Project;
- **Permanent effects** – effects which could result from an irreversible change to the baseline environment or which persist for the near future, and occur during construction or operation stages;
- **Temporary effects** – effects which could persist for a limited period only and occur mainly during construction;
- **Positive effects** – effects which could have a beneficial influence on receptors and resources; and
- **Negative effects** – effects which could have an adverse influence on receptors and resources.

4.8.5 Determining Significance

The objective of this ESIA is to identify the likely significant effects of the Project on the environment and people.

Impacts that have been evaluated as being ‘Moderate’ or ‘Major’ are considered to be significant effects and identified as such in the specialist chapters. Consequently, effects that are ‘Minor’ or ‘Negligible’ are not significant.

4.8.6 Cumulative Assessment

The assessment of cumulative effects considers the combination of multiple effects that may result when the Project is considered alongside other existing or proposed projects in the same geographic area or similar development timetable. The assessment of cumulative effects will identify where particular resources or receptors would experience significant adverse or beneficial effects as a result of a combination of other projects ('inter-project cumulative effects').

In addition, the interaction of multiple impacts from the Project upon the same receptor can also result in cumulative effects. These would only consider impacts from this Project ('intra-project cumulative effects) and are also be presented in this ESIA.

4.9 Mitigation and Enhancement Measures

Where feasible, the following hierarchy of mitigation measures are applied:

- Avoid and reduce impacts and effects through design (embedded mitigation),
- Minimise impacts and effects at source or at receptor,
- Repair, restore or reinstate to address temporary construction effects, and
- Compensate for loss or damage.

In addition to the above, community engagement and disclosure activities will play a key role in managing the extent of effects and consideration has also been given to the identification of enhancement measures. Enhancement measures are actions and processes that:

- Create new positive impacts and effects, or benefits,
- Increase the reach or number of positive impacts and effects, or benefits, and
- Distribute positive impacts and effects, or benefits, more equitably.

Each technical chapter identifies relevant mitigation and enhancement measures. All the mitigation, management and monitoring measures to address likely Project effects reported in the ESMP.

4.10 Residual Impacts

Residual impacts are those that remain after the application of mitigation and enhancement measures. Impacts considered 'Major' or 'Moderate' after application of mitigation and enhancement measures are presented as 'significant' residual impacts. These are identified as part of this ESIA study.

4.11 Uncertainty

Any uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other limitations are explicitly stated. Where applicable, the ESIA makes recommendations concerning measures that should be put in place with monitoring or environmental or social management plans to deal with the uncertainty so that they may be addressed.

5 Water Quality, Hydrology and Hydrogeology

5.1 Introduction

This chapter summarizes the potential effects on the water quality, hydrology and hydrogeology components associated with the Project's construction and operation phases in accordance with the national legislation, IFC, EBRD, EP IV and WBG EHS guidelines and other applicable standards. It details the baseline conditions in and around the Project site, describes the identification and assessment of effects on each receptor and identification of mitigation measures proposed for potentially significant effects.

Construction activities may result in contaminating the groundwater sources through accidental pollution spills and infiltration of any other pollutants to soil. Construction activities, such as grading and excavation, and implementation of on-site storm water management, including culverts and drainage ditches, may alter surface runoff patterns by diverting natural drainage into new areas and locally increasing runoff volume. Elevated levels of hydrocarbons, oils, heavy metals, suspended solids and organic compounds originating from routine construction activities and coliform bacteria from human waste may also interfere to water resources via surface runoff and may have significant impacts on water quality. Furthermore, soil erosion may be in question locally due to ground surface disturbance. Depending on the erosion potential of the soil, local terrain, vegetation cover, and distance to the surface water bodies, soil erosion may lead to degradation of water quality in nearby surface water bodies.

Additionally, water will be needed for potable usage, drinking and dust suppression. Thus, impacts on water resources is foreseen during construction phase. On this basis, it is intended that consideration of water quality, hydrology, and hydrogeology impacts during the construction phase will be scoped in for the assessment as part of the ESIA.

However, no significant impact on water sources is anticipated due to activities to be carried out during operation phase. On this basis, it is intended that consideration of water quality, hydrology, and hydrogeology impacts during the operational phase will be scoped out for future assessment as part of the ESIA. In addition, Pollution Prevention and Resource Efficiency Management Plan (PLAN-ESMS-PPREMP-03) is in place. This plan involves management procedures, mitigation measures, and monitoring requirements for unplanned events such as spill for construction and operation phase.

The purpose of the assessment is to ensure that relevant national and international legislation and guidelines are complied with in order that water features and water resources in the area are protected.

5.2 Methodology

The magnitude, sensitivity of a receptor and significance of the impacts are assessed using the general methodology as outlined in Section 4.8.

5.2.1 Applicable Guidelines and Standards

Beside detailed regulation, guideline and standards framework given in *Chapter 3: Policy, Legal and Institutional Framework*, each chapter presents topic-based policy and legislations. In this chapter, water quality, hydrology and hydrogeology related policy and legislation are given.

5.2.1.1 National Requirements

National legislation and policy in Türkiye relating water quality, hydrology and hydrogeology applicable to the Project are shown in Table 5.1.

Table 5.1: National Policy and Legislation Relating to Water Quality, Hydrology and Hydrogeology

Law/Regulation	Official Gazette (OG) date	OG Number
Environmental Law (2872)	11.08.1983	18132
Regulation on Environmental Impact Assessment	29.07.2022	31097
Surface Water Quality Regulation	30.11.2012	28483
Water Pollution Control Regulation	31.12.2004	25687
Regulation on the Protection of Groundwater against Pollution and Deterioration	04.07.2012	28257
Regulation on Control of Pollution Caused by Hazardous Substances in Aquatic Environment (76/464/AB)	26.11.2005	26005
Regulation on the Quality and Treatment of Drinking Water Supply	06.07.2019	30823
Law on Groundwaters (167)	23.12.1960	10688
Regulation on Water for Human Consumption	07.03.2013	28580
Regulation on the Quality and Treatment of Drinking Water Supply	06.07.2019	30823
Regulation on the Protection of Drinking Water Basins	28.10.2017	30224
Regulation on Control of Pollution Caused by Hazardous Substances in Aquatic Environment (76/464/AB)	26.11.2005	26005
State Hydraulic Works (DSI) Groundwater Technical Regulation	23.06.1972	14224
Flood and Sediment Control Regulation	03.05.2019	30763
Disaster Regulation for Highway Engineering Structures	07.12.2006	26369
Regulation on the Protection of Wetlands	04.04.2014	28962

5.2.1.2 International Requirements

International legislation and policy and lender's standards and guidelines relating water quality, hydrology, and hydrogeology applicable to the Project are shown in Table 5.2.

Table 5.2: International Legislation and Policy Relating to Water Quality, Hydrology and Hydrogeology

Policy
EBRD Environmental and Social Policy and Performance Requirements (PR) (2019)
European Commission Environmental Impact Assessment (EIA) Guidelines
European Commission's Guidance Document on Wind Energy Developments and EU Nature Legislation (2020)
EU Council Directive 2000/60/EC Water Framework Directive (WFD)
EU Council Directive 2020/2184/EC on the Quality of Water Intended for Human Consumption
EU Council Directive 91/271/EEC on Urban Wastewater Treatment and Directive 98/15/EEC amending Directive 91/271/EEC
EU Council Directive 2006/118/EC Groundwater Directive (GWD)

Policy
IFC's Environmental, Health and Safety (EHS) Guidelines for Wind Energy (2015)
IFC's Environmental, Health and Safety (EHS) Guidelines for Electric Power Transmission and Distribution (2007)
IFC Performance Standards (PSs) on Environmental and Social Sustainability (2012)
IFC Sustainability Framework (updated in 2012)
IFC Good Practice Note: Managing Contractor's Environmental and Social Performance (2017)
World Bank Group Environmental, Health, and Safety General Guidelines (EHS General Guidelines) (2007)
WHO Guidelines for Drinking-water Quality: Fourth edition incorporating the first and second addenda

5.2.1.3 Project Standards

National and international requirements for water quality, hydrology, and hydrogeology are mentioned within Section 5.2.1.1 and Section 5.2.1.2. All the provisions of these standards and guidelines will be complied with. Specific commitments and mitigation measures are provided in Section 5.5 of this chapter.

IFC EHS General Guidelines clearly state that when host country regulations differ from the levels and measures presented in the IFC EHS General Guidelines, projects are expected to achieve whichever is more stringent. The comparison between national and international standards for groundwater quality is presented in Table 5.3.

It was noted that, no water quality analysis was carried out within the scope of the National EIA studies. As highlighted in the Scoping Report, the Consultant has carried out groundwater sampling & analysis study withing the scope of the ESIA to be able to further assess the impact on ground water according to the national and international standards. Groundwater sampling results are presented in Table 5.4.

During the site visit, it was observed that project affected people are using the groundwater resources for drinking purposes besides the irrigation when required. Therefore, Regulation on Water for Human Consumption (OG Date/Number: 07.03.2013/28580) and WHO Drinking Water Standards are accepted as Project Standards for groundwater quality.

The selection of parameters has been done according to information given in "Guideline values for individual chemicals, by source category[30]". WHO provides list of chemicals in five categories as provided below:

9. Naturally occurring chemicals,
10. Chemicals from industrial sources and human dwellings,
11. Chemicals from agricultural activities,
12. Chemicals used in water treatment or from materials with drinking water, and
13. Chemicals of emerging concern.

Water treatment plant will not be established within the scope of the Project. Therefore, parameters listed in the *chemicals used in water treatment or from materials with drinking-water* are not anticipated to be found. Similarly, chemicals of emerging concern (e.g., pharmaceuticals) were not considered since the parameters are not anticipated to be found in and around the Project area.

[30] Guidelines for drinking-water quality: fourth edition incorporating the first addendum (4th ed., pp. 176-190). Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO

The parameters listed in *naturally occurring chemicals* and *chemicals from industrial sources and human dwellings* are more intensively anticipated to be found in and around the Project area when comparing to aforementioned list of parameters. Consequently, below parameters have been selected to be analysed.

Table 5.3: Groundwater Quality Standards

Parameter-Unit	National Value (Regulation on Water for Human Consumption (OG Date/Number: 07.03.2013/28580)	International Value (WHO) (Guidelines for Drinking-water Quality: Fourth Edition)	Project Standard (i.e. the stringent of the two)
pH	≥ 6.5 & ≤ 9.5	≥ 6.5 & ≤ 9.5	≥ 6.5 & ≤ 9.5
Conductivity	2500 µS / cm at 20°C	-	2500 µS / cm at 20°C
Temperature	-	-	Baseline Level
Saltiness	-	-	Baseline Level
Dissolved Oxygen	-	-	Baseline Level
Nitrate	50 mg/L	50 mg/L	50 mg/L
Nitrite	0.50 mg/L	3 mg/L	3 mg/L
Ammonium	0.50 mg/L	-	0.50 mg/L
Total Phosphorus	-	-	Baseline Level
Total Organic Carbon	-	-	Baseline Level
Chloride	-	0.7 mg/L	0.7 mg/L
Sulphate	250 mg/L	-	250 mg/L
Carbonate	-	-	Baseline Level
Bicarbonate	-	-	Baseline Level
Fluoride	1.5 mg/L	1.5 mg/L	1.5 mg/L
Total Cyanide	50 µg/L	-	50 µg/L
Calcium	-	-	Baseline Level
Magnesium	-	-	Baseline Level
Sodium	200 mg/L	-	200 mg/L
Potassium	-	-	Baseline Level
Chromium +6	-	-	Baseline Level
Suspended Solids	-	-	Baseline Level
Arsenic	10 µg/L	10 µg/L	10 µg/L
Cadmium	5.0 µg/L	3.0 µg/L	3.0 µg/L
Lead	10 µg/L	10 µg/L	10 µg/L
Mercury	1.0 µg/L	6.0 µg/L	1.0 µg/L
Aluminium	200 µg/L	-	200 µg/L
Antimony	5.0 µg/L	20.0 µg/L	5.0 µg/L
Copper	2 mg/L	2 mg/L	2 mg/L
Barium	-	1.3 mg/L	1.3 mg/L
Beryllium	-	-	Baseline Level
Zinc	-	-	Baseline Level
Total Chromium	50 µg/L	50 µg/L	50 µg/L
Nickel	20 µg/L	70 µg/L	20 µg/L
Manganese	50 µg/L	80 µg/L	50 µg/L
Selenium	10 µg/L	40 µg/L	10 µg/L
Boron	1 mg/L	2.4 mg/L	1 mg/L

5.2.2 Study Area and Area of Influence

The AoI regarding water quality, hydrology and hydrogeology is the area that could potentially be affected by disturbance and contamination due to the construction activities and operation of the Project.

A 1 km radius from the site is used to assess groundwater and surface water derived receptors. The AoI is based upon professional judgement and experience of assessing similar developments. It is considered that at distances from the site in excess of 1km, attenuation and dilution of substances is likely to occur. Therefore, the proposed development is unlikely to have a hydrological effect beyond the area of influence.

5.2.3 Limitations and Assumptions

Anticipated impacts on the surface water bodies are surface or stormwater runoff; contaminated sediments due spills which have occurred during dry conditions; and the likelihood of contamination due to above-mentioned reasons is considered as low. Additionally, it is assumed that there will not be significant discharge resulting from the construction activities. Therefore, sampling study and laboratory analysis will not be conducted for surface water sources in the vicinity of the Project area.

It is anticipated that construction works of the Project may have negative impacts on the groundwater sources in the vicinity of the Project area due to contamination, leakage, etc. Therefore, groundwater sampling and laboratory analysis are performed to assess baseline groundwater quality.

It is also assumed that the operational activities of the Project will not have significant impacts on the surface water and groundwater sources in the vicinity.

5.3 Baseline Conditions

The baseline status of water bodies near the Project area have been examined by considering surface water and groundwater bodies. Within this scope, information regarding the baseline status of surface waters and groundwaters were obtained by examining the below documentation:

- Pelit WPP National EIA Report, 2018, En-Çev
- Fırat – Dicle Basin, Fırat Sub-basin Flood Management Plan, 2020, MoAF, General Directorate of Water Management
- National Basin Management Strategy (2014-2023), 2014, MoAF
- Sivas Province Environmental Status Report for 2022, 2023, Sivas Governorship Provincial Directorate of Environment, Urbanisation and Climate Change
- Google Earth Satellite Images

5.3.1 Hydrology

The Project License area remains within the Fırat sub-basin of the Fırat – Dicle Basin (Figure 5.1). Fırat – Dicle Basin has an annual average flow of 52.94 km^3, which corresponds to the 28.5% of Türkiye's overall flow, in an approximately 185,000 km^2 of rainfall area[31]. The most important water body is the Fırat River in the basin. The Fırat River has the highest water potential and is the most fruitful river in the Türkiye. After passing through many cities in

[31]National Basin Management Strategy (2014-2023), 2014, MoAF

Türkiye, the Fırat River enters Syrian territory and then Iraqi territory. Finally, the Fırat River merges with the Dicle River to form the Shatt al-Arab and flows into the Persian Gulf[32].

The Fırat River has number of either big or small tributaries. One of them, namely Tohma River, is found as one of the significant water bodies in the Sivas Province. Tohma River, which has 151.05 km of length, is approximately 20 km away from the closest Turbine. According to the Sivas Province Environmental Status Report, Tohma River is and mainly used for irrigation and energy production in the region[33].

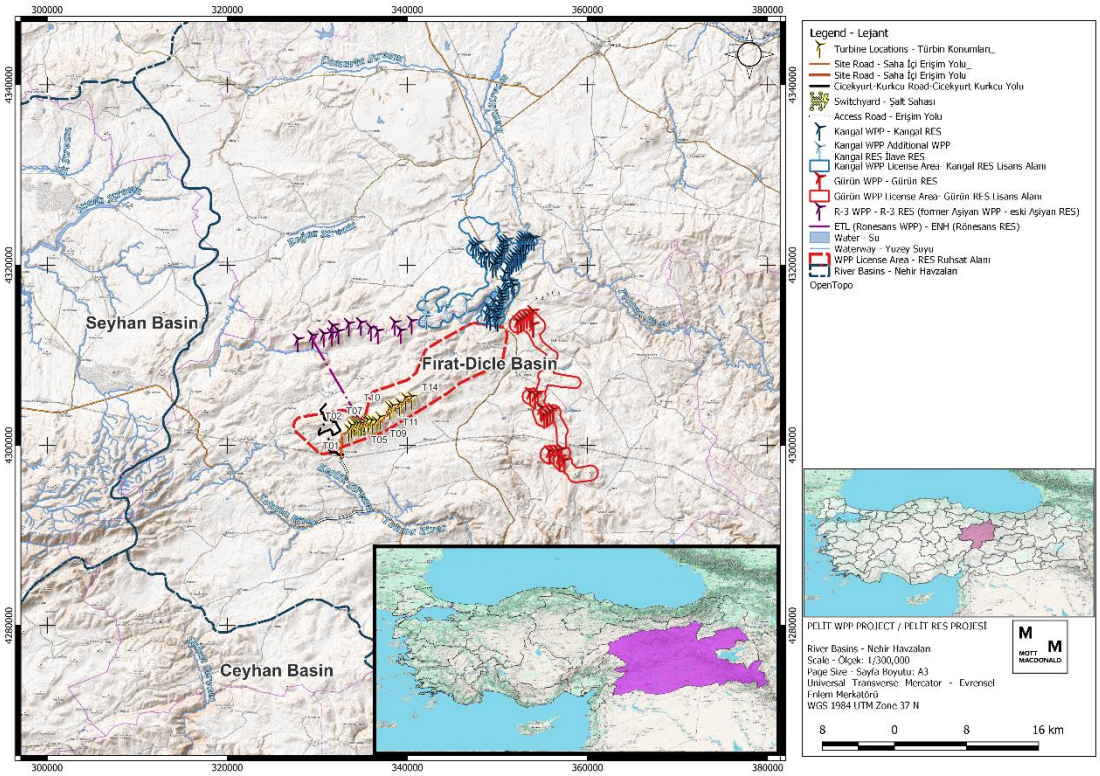


Figure 5.1: Project Location & Fırat – Dicle Basin (National Basin Management Strategy (2014-2023), 2014, MoFA)

Keşlik Stream, which is one of the tributaries of Tohma River, is located approximately 5 km south of the closest Turbine location. Additionally, Alimpınarı Stream, Behram Stream, and other tributaries of Tohma River can be listed as other nearby surface water bodies located approximately 9 km northwest, 9 km northeast and 10 km west of the closest Turbine location, respectively. Furthermore, very small part of the Behram Stream is located within the Project Licence area (Figure 5.2).

During the site visit, Gürün District Directorate of Agriculture and Forestry and local people were consulted to gather information related to water use activities in the Project area. It was mentioned that access road route passes near to a water supply infrastructure which is being used by the local people living in the close vicinity of the Project area. Therefore, potential impacts on the water supply infrastructure will be further identified, assessed with mitigation measures within the scope of the ESIA studies.

[32]Fırat – Dicle Basin, Fırat Sub-basin Flood Management Plan, 2020, MoAF, General Directorate of Water Management

[33]Sivas Province Environmental Status Report for 2022, 2023, Sivas Governorship Provincial Directorate of Environment, Urbanisation and Climate Change

During these meetings, it was found that surface water bodies are not being used neither for agricultural nor domestic purposes. During these meetings, it was stated that the amount of rainfall has decreased in the recent years and flood events are not commonly encountered in the region. On the other hand, according to the National EIA Report, flood events occur frequently in Sivas Province. Flood events seen in the regions of Sivas Province are located in the Kızılırmak Basin. It was stated that flood events especially seen in Sivas Centre, İmranlı, Yıldızeli and Zara districts located on the Kızılırmak Valley. The closest of these districts is approximately 70 km away from the Project area.

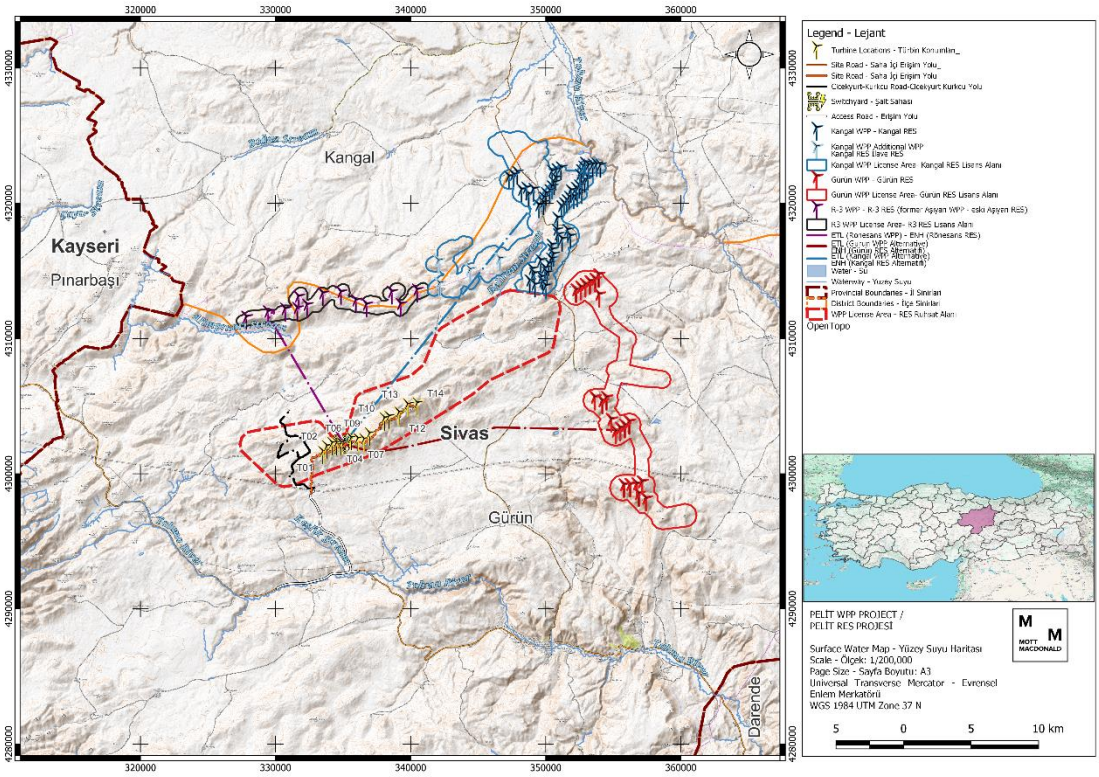


Figure 5.2: Project area and nearby surface water bodies

Approximately 69% of the Sivas city's drinking and utility water needs are met from underground sources, while 31% come from surface water resources. The daily water requirement fluctuates between 1,100 and 1,500 liters per second, depending on seasonal conditions. Groundwater is supplied through wells and groundwater drainage in the Tavra Valley. The city's primary surface water source is the 4 Eylül Dam, constructed on the Mısmilirmak River for drinking water purposes. Water extracted from the 4 Eylül Dam and Tavra Valley undergoes purification at the drinking water treatment plant before being distributed to the city. 4 Eylül Dam and Tavra valley are located approximately 100 km away from the Project area in the north[34]. Therefore, no significant impact is anticipated on the drinking water sources of the Sivas Province due to the Project.

[34] Sivas Province Environmental Status Report for 2022, 2023, Sivas Governorship Provincial Directorate of Environment, Urbanisation and Climate Change

5.3.2 Hydrogeology

In order to understand and assess the hydrogeological features beneath the Project License area, a geotechnical report will be developed by the end of August 2024 within the scope of zoning plan studies conducted by Project Company. Once the report will be completed, the Consultant will review the geotechnical report and the technical details will be assessed to reveal existence of groundwater sources (if any), permeability and characteristics of the rock and deposits (e.g., silt, sand, or gravel), or properties of fractures that control or affect contaminant transport and remediation[35,36].

Groundwater potential of the Sivas Province is 339 hm^3 annually. In the region of Sivas Province, groundwater has been used for irrigation, drinking, domestic, and industrial purposes. In 2022, 71.243 hm^3 of groundwater has been allocated comprising 39.75 hm^3 for drinking-domestic purposes, 12.75 hm^3 for irrigation purposes, and 18.741 hm^3 for industrial purposes.

According to the Sivas Province Environmental Status Report, groundwater levels change depending on monthly rainfall. Lowest static levels generally measured in August, September and October[37].

According to information received from the Project Company, groundwater will be used for utility water source in the construction phase. Utility water will be supplied from a well which is currently used by Çiçekliyurt village and used for utility purposes, such as dust suppression and construction needs. The Consultant was informed that water will be stored in a 10-ton water tank before being used in the construction site. Additionally, the Consultant was also informed that same well in the Çiçekliyurt village will be utilized in the operation phase of the Project. It should also be noted that unlicensed groundwater usage or opening new wells are not allowed either by State Hydraulic Works (DSI) or Sivas City Administration depending on the neighbourhood location. Therefore, additional groundwater utilization in addition to the existing well is not anticipated during construction and operation phase of the Project.

5.3.3 Water Quality

According to the Sivas Province Environmental Status Report, no pollution stress in place on water resources due to domestic wastewater. Additionally, it has been mentioned that wastewaters resulted from industrial facilities also not creating pollution stress on water resources. However, it has been highlighted that both surface water and groundwater may be affected due to irregular waste storage/disposal areas in the districts.

It has been stated that Provincial Directorate of Agriculture and Forestry regularly conducting water quality measurements by means of nitrate levels of surface and groundwater resources that may be polluted due to agricultural activities[38]. However, according to information gathered from Gürün Directorate of Agriculture and Forestry, there is no major stress on water resources around the Project area.

Within the scope of this ESIA Study, groundwater sampling was carried out at Çiçekyurt Village. Tap water samples, which are representing the groundwater quality without a treatment, were

[35] National Academies of Sciences, Engineering, and Medicine. 2020. Characterization, Modeling, Monitoring, and Remediation of Fractured Rock. Washington, DC: The National Academies Press. https://doi.org/10.17226/21742

[36] Interstate Technology and Regulatory Council (ITRC), Characterization and Remediation of Fractured Rock, Web-based document FracRx-1, 2017, retrieved on 29 Junly 2024.

[37] Sivas Province Environmental Status Report for 2022, 2023, Sivas Governorship Provincial Directorate of Environment, Urbanisation and Climate Change

[38] Sivas Province Environmental Status Report for 2022, 2023, Sivas Governorship Provincial Directorate of Environment, Urbanisation and Climate Change

collected from drinking foundation available in the village. Groundwater sampling measurement results are provided in Table 5.4.

Table 5.4: Groundwater Sampling Analysis Results

Parameter-Unit	National Value (Regulation on Water for Human Consumption (OG Date/Number: 17.2.2005/25730)	International Value (WHO) (Guidelines for Drinking-water Quality: Fourth Edition)	Project Standard (i.e., the stringent of the two)	Çiçekyurt Village X: 38.823437 Y: 37.074785
pH	≥ 6.5 & ≤ 9.5	≥ 6.5 & ≤ 9.5	≥ 6.5 & ≤ 9.5	7.91
Conductivity	2500 µS / cm at 20°C	-	2500 µS / cm at 20°C	544 µS / cm
Temperature	-	-	Baseline Level	12.2
Saltiness	-	-	Baseline Level	0.26 ‰
Dissolved Oxygen	-	-	Baseline Level	6.79 mg/L
Nitrate	50 mg/L	50 mg/L	50 mg/L	47.7 mg/L
Nitrite	0.50 mg/L	3 mg/L	3 mg/L	<0.33 mg/L
Ammonium	0.50 mg/L	-	0.50 mg/L	0.040 mg/L
Total Phosphorus	-	-	Baseline Level	0.078 mg/L
Total Organic Carbon	-	-	Baseline Level	<4 mg/L
Chloride	-	0.7 mg/L	0.7 mg/L	10.5 mg/L
Sulphate	250 mg/L	-	250 mg/L	23.4 mg/L
Carbonate	-	-	Baseline Level	<10 mg/L
Bicarbonate	-	-	Baseline Level	219 mg/L
Fluoride	1.5 mg/L	1.5 mg/L	1.5 mg/L	<0.1 mg/L
Total Cyanide	50 µg/L	-	50 µg/L	<0.005 mg/L
Calcium	-	-	Baseline Level	87.1 mg/L
Magnesium	-	-	Baseline Level	6.39 mg/L
Sodium	200 mg/L	-	200 mg/L	7.67 mg/L
Potassium	-	-	Baseline Level	13.7 mg/L
Chromium +6	-	-	Baseline Level	<0.02 mg/L
Suspended Solids	-	-	Baseline Level	<10 mg/L
Arsenic	10 µg/L	10 µg/L	10 µg/L	0.002 mg/L
Cadmium	5.0 µg/L	3.0 µg/L	3.0 µg/L	<0.0002 mg/L
Lead	10 µg/L	10 µg/L	10 µg/L	<0.001 mg/L
Mercury	1.0 µg/L	6.0 µg/L	1.0 µg/L	<0.001 mg/L
Aluminium	200 µg/L	-	200 µg/L	<0.002 mg/L
Antimony	5.0 µg/L	20.0 µg/L	5.0 µg/L	<0.002 mg/L
Copper	2 mg/L	2 mg/L	2 mg/L	0.0019 mg/L
Barium	-	1.3 mg/L	1.3 mg/L	0.044 mg/L
Beryllium	-	-	Baseline Level	<0.002 mg/L
Zinc	-	-	Baseline Level	<0.002 mg/L
Total Chromium	50 µg/L	50 µg/L	50 µg/L	0.035 mg/L
Nickel	20 µg/L	70 µg/L	20 µg/L	0.005 mg/L
Manganese	50 µg/L	80 µg/L	50 µg/L	<0.001 mg/L
Selenium	10 µg/L	40 µg/L	10 µg/L	<0.001 mg/L
Boron	1 mg/L	2.4 mg/L	1 mg/L	<0.025 mg/L

As it can be seen from Table 5.4, the analysis results have been compared with the threshold values for Regulation on Water for Human Consumption (OG Date/Number: 17.2.2005/25730) and WHO Guidelines for Drinking-water Quality: Fourth Edition. Accordingly, all analysed parameters are within the limits specified in Project standards except Chloride levels. High concentrations of Chloride, i.e., excess of 250 mg/L, lead change in the taste of water and beverages[39]. In addition, no health-related issues were mentioned regarding Chloride levels in the WHO Guidelines for Drinking-water Quality: Fourth Edition.

5.4 Impact Assessment

A wind energy project can impact surface water and groundwater in several different ways, including the use of water resources, changes in water quality, and the alteration of interactions between the groundwater and surface water. For the most part, however, wind energy development does not require much water, except during the construction phase and, to a lesser extent, during decommissioning. These water uses are temporary, and during the operation phase, water use would be minimal.

This section describes the types of impacts that might occur during each phase of the development.

5.4.1 Construction

5.4.1.1 Use of Water Resources

There will be numerous activities that would use water during construction. According to the information shared by the Project Company the construction period of the Project will be 13 months. Hence, potentially significant amounts of water would be needed. The construction of the Project has been initiated in the second quarter of 2024 with the construction of Project roads and is planned to be completed by the third quarter of 2025. The Project construction schedule is provided in *Section 2.5.2*

Following activities would be listed related to use of water resources:

- Water will be used for dust control during construction of access roads, clearing of vegetation, grading and road traffic
- Water will be used by the construction personnel

The drinking water will be supplied from dispenser size bottled water. In addition, the utility water will be used during the construction phase to meet the personnel needs as well as to prevent generation of dust during construction activities. The need for utility water will be supplied from a well which is currently used by Çiçekliyurt village. The water will be stored in a 10-ton water tank before being used in the construction site.

The amount of drinking and potable water, published by TurkStat (2022 Municipal Statistics), for the personnel planned to work within the scope of the Project was determined as 297 L/person-day for Sivas province. Expected maximum amount of water consumption for drinking and potable for the personnel is 14.85 m^3/day (usage amount as a worst case scenario) since the number workers will be approximately maximum of 50 during the construction. Nevertheless, according to the information shared by the Project Company, water consumption is approximately 4-5 m^3/day during the early stages of construction.

According to the information received from the Project Company, two Ready Mixed Concrete Plant with a capacity of 90 m^3/hour (total capacity of 180 m^3/hour) are planned to be established. Depending on the aggregate size and inclusion of chemicals, maximum amount of

[39] Guidelines for Drinking-water Quality: Fourth edition, 2017, World Health Organization

water needed varies between 140 kg (0.14 m³) and 260 kg (0.26 m³) water per cubic meters of concrete[40]. Accordingly, water utilization of two Ready Mixed Concrete will be between 25.2 m³/hour and 46.8 m³/hour if plants run with maximum capacity (as a worst-case scenario).

The required utility water will be met through available well in the nearby Çiçekliyurt village as mentioned above. Although direct use of surface water resources is not anticipated, groundwater usage will be in place during the construction. It should be noted that in order to use groundwater, the Provincial Special Administration should be noticed, and the necessary permits should be obtained from the Provincial Special Administration. These permits are given based on a maximum flow rate. In this sense, the amount of water to be used will not exceed this maximum flow rate during the construction. Therefore, likelihood of using groundwater water resources is certain, whereas likelihood of using surface water resources is unlikely. Similarly, the anticipated severity of the impact will be minor and moderate for surface water and groundwater, respectively. Additionally, the spatial extent of the impact is within the AoI.

The sensitivity of surface waters in the vicinity of the Project area are evaluated as medium since they do not provide vital ecosystem services nor urban water supplies (see Table 5.6). Additionally, surface water sources are not utilized for drinking purposes in the vicinity of the Project area.

However, groundwater resources in the region are utilized by some of the Project Affected Persons (PAPs), such as Çiçekliyurt residents, for drinking and domestic purposes. Thus, groundwater sensitivity is evaluated as medium (see Table 5.8).

Thus, the significance of impacts is assessed as negligible for surface water, whereas significance of impacts is assessed as major for groundwater.

5.4.1.2 Water Quality Alteration

During the construction phase of the Project, there will be an increase in traffic at the site due to transport of material and construction activities. This will increase the risk of contamination of surface water and groundwater bodies by accidental spills, hydrocarbon-based oils and lubricants, heavy metals, suspended solids, and organic compounds.

Dust creation and settlement, excavations, the presence of stockpiles of exposed soil and concrete may potentially lead to high suspended solid/sediment loads within surface runoffs especially during rainfall events. Stormwater comprises surface runoff and flows resulting from various sources, including precipitation and drainage. As stated in the World Bank Group Environmental, Health, and Safety General Guidelines (EHS General Guidelines) (2007), stormwater runoff carries suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, among other contaminants. Furthermore, rapid runoff, even from uncontaminated stormwater, can cause erosion of banks and stream beds, which ultimately degrades the quality of the receiving water.

Groundwater in the region is one of the main water supply resources for local people especially for their daily activities. Thus, groundwater is an important resource having role in their livelihood. As previously mentioned, PAPs are using the groundwater resources for drinking purposes besides the irrigation when required.

The sensitivity of the groundwater resource is evaluated as medium. It is anticipated that impacts on the groundwater will cause permanent or temporary decrease in groundwater levels deterioration. Therefore, the magnitude of impact due to groundwater contamination assessed as medium. The spatial extent of the impact is within the AoI, and it does not likely to affect the

[40] Turkish Standard TS802:2016, Design of Concrete Mixes (ICS 91.100.30, Concrete and concrete products), March 2016, Turkish Standards Institute

local people's livelihood. The anticipated severity of the impact will be moderate. In addition, within the scope of the Project, groundwater will be used for utility purposes in the construction site. As mentioned above, utility water will be supplied from the available well which is currently used by the Çiçekliyurt residents. Thus, the significance of impact is assessed as moderate.

5.4.1.3 Alteration of Water Flow Systems

Construction activities could alter the interaction between surface water bodies and local groundwater in systems where the two resources are hydrologically connected. In these circumstances, extracting water from one source eventually could affect the other source as well. Similarly, altering the water quality of one source could affect the water quality of other sources at downgradient locations. Impacts related to water extraction is not anticipated since water withdrawal from surface water or groundwater bodies is not planned in the scope of the Project.

Impacts also could occur if construction activities (e.g., excavation, trenching) create a conduit between a surface water body and a groundwater aquifer, or between two aquifers, by breaching the hydrologic barrier. This could result in unwanted dewatering or recharge of any of these water resources, depending on local hydrogeologic conditions.

In addition, storm water control systems and any other activity that alters the ground surface could affect groundwater infiltration as well as the response time of a nearby surface water body.

The anticipated severity of alteration of water flow systems and surface water & groundwater interaction is assessed as moderate. The spatial extent of the impact is within the AoI, and it does not likely to affect the local people's livelihood. Alteration of above-mentioned hydrological and hydrogeological systems due to construction activities is not likely. Considering the impact magnitude is minor and reversible with medium receptor sensitivity of surface water (ones with seasonal flow) and groundwater sources in the close vicinity of the Project area, the impact significance can be assessed as moderate.

5.4.2 Operation

If appropriate mitigation measures are implemented during the construction phase, potential impacts to water during operation phase would be limited to the degradation of water quality as a result of accidental spills or vehicle traffic. In this context, Pollution Prevention and Resource Efficiency Management Plan (PLAN-ESMS-PPREMP-03) has been prepared by the Project Company. The purpose of this Pollution Prevention and Resource Efficiency Management Plan is to manage the conditions which can lead to possible environmental detrimental impacts caused by the Project activities, including water pollution. Moreover, it also summarizes the plans and response procedures that will be implemented in emergency situations regarding pollution prevention for operation phase.

5.4.2.1 Excessive groundwater abstraction

Groundwater is an important resource having role in local people's livelihood in the region. The sensitivity of the groundwater resource is medium. The magnitude of impact due to increased groundwater use from the same resource is assessed as moderate. It is anticipated that impacts on the groundwater levels will not cause permanent decrease provided that necessary mitigation measures are taken. Therefore, the magnitude of impact due to groundwater abstraction assessed as moderate. The spatial extent of the impact is within the AoI, and it does not likely to affect the local people's livelihood beyond the Project area.

It should also be noted that unlicensed groundwater usage or opening new wells are not allowed either by State Hydraulic Works (DSI) or Sivas City Administration depending on the

neighbourhood location. Therefore, additional groundwater utilization in addition to the existing well is not anticipated during construction and operation phase of the Project. Thus, the significance of impact is assessed as moderate.

5.4.3 Summary

Assessment of impacts on water quality, hydrology and hydrogeology was done based on the methodology presented in Section 5.2. Accordingly, the magnitude of each impact was estimated as a factor of the foreseen: geographic extent, duration, reversibility, and frequency of the impact, based on expert's judgement. Sensitivity/value of the associated resource/receptor was determined in consideration of the baseline conditions described in the previous sections. Table 5.9 presents a summary of the construction and operation impacts and their likely significance before the application of mitigation.

Specific sensitivity/value criteria considered in assessing the impacts on hydrology, hydrogeology, and water quality is provided below.

Table 5.5: Impact Magnitude Criteria for Surface Waters

Magnitude	Definition
Major	• Contamination of surface water degrades the existing water quality by 100% of the original Water quality. • Potentially severe effects on surface water quality are likely to be long-lasting (e.g., months or more) or permanent and/or give rise to indirect ecological and/or socio-economic impacts. • There are known/expected physical (property, agricultural fields, infrastructure, etc.) or sensitive ecological receptors upstream or downstream within the catchment that could experience a 'significant increase in flood frequency (above baseline conditions) as a result of the Project.
Moderate	• Contamination of surface water degrades the existing water quality by 50% of the original water quality. • Potential localized effects on water quality are likely to be fairly long-lasting (e.g., weeks or months) and/or give rise to indirect ecological and/or socio-economic impacts. • There are known/expected physical (property, agricultural fields, infrastructure, etc.) or sensitive ecological receptors upstream or downstream within the catchment that could experience an increase in flood frequency (above baseline conditions) as a result of the Project.
Minor	• Contamination of surface water degrades the surface water run-off quality by 10% of the original water quality. Potential short-term localized effects on water quality but which are likely to return to equilibrium conditions within a short timeframe (e.g., hours or days at most). • There are no known/expected physical (property, agricultural fields, infrastructure, etc.) or sensitive ecological receptors upstream or downstream within the catchment that could be affected by the changed drainage regime.
Negligible	• Contamination of surface water that is temporary and that does not degrade the existing surface water run-off quality. • Potential short-term localized effects on water quality but likely to be highly transitory (e.g., lasting a matter of hours) and well within natural fluctuations. • There is likely to be no alterations to existing drainage regimes and characteristics at any time of year

Table 5.6: Surface Water Sensitivity/Value Criteria for Resource/Receptors

Value	Definition
High	• Watercourse with high quality e.g., in its natural state and with ecological importance. • The watercourse provides vital ecosystem services. • The watercourse provides urban water supplies, major industrial abstraction or large irrigation supplies.
Medium	• The watercourse supports diverse populations of aquatic habitats. • The watercourse provides ecosystem services to some extent.

Value	Definition
	• Watercourse used for local water supply source, small industrial abstraction or minor irrigation scheme
Low	• Watercourse located in the vicinity that does not support diverse aquatic habitat. • Watercourse already significantly modified from some aspect of a natural condition. • Watercourse with little or no community use.

Table 5.7: Impact Magnitude Criteria for Groundwater

Magnitude	Definition
Major	Discharges to groundwater are likely to cause breaches of statutory discharge limits (over extended periods) and cause background levels to be above the site-specific long-term cancer and hazard risk levels (provided in Turkish Regulation on Soil Pollution Control and Point Source Contaminated Sites).
Moderate	Discharges to groundwater bodies are expected to cause breach(s) of statutory limits (over limited periods) and cause background levels to be below the site-specific but above the generic long-term cancer and hazard risk levels (provided in Turkish Regulation on Soil Pollution Control and Point Source Contaminated Sites).
Minor	Discharges to groundwater are expected to be within (but perhaps close to) statutory limits and will cause background levels to increase but remain below the generic risk levels for all sites (levels provided in Turkish Regulation on Soil Pollution Control and Point Source Contaminated Sites).
Negligible	Discharges to groundwater are expected to be well within statutory limits.

Table 5.8: Groundwater Sensitivity/Value Criteria for Resource/Receptors

Value	Definition
High	• Project area falls within a groundwater protection zone • Groundwater that provides baseflow to surface watercourses that have high quality or supports a wetland with ecological importance
Medium	• Groundwater that is used for drinking or domestic purposes. • Groundwater that is abstracted for industrial purposes or agriculture (i.e., irrigation purposes).
Low	• Groundwater is available, however additional treatment is required to be utilized • Groundwater that provides baseflow to surface watercourses used for recreational fishing.
Negligible	• No aquifer or groundwater in deep aquifers. • Low-quality groundwater is not used by the community. • Groundwater that does not provide or provide very little baseflow to surface watercourses or support habitats.

Table 5.9: Summary of Construction Impacts

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Construction Impacts									
Use of Water Resources	Surface water bodies	Minor	Construction	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
	Groundwater bodies	Moderate	Construction	AoI	Reversible	Certain	Major	Medium	Major

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Water Quality Alteration	Surface water bodies	Minor	Construction	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
	Groundwater bodies	Moderate	Construction	AoI	Reversible	Low	Moderate	Medium	Moderate
Alteration of Surface Water & Groundwater Interaction	Surface water bodies & Groundwater bodies	Moderate	Construction	AoI	Reversible	Unlikely	Moderate	Medium	Moderate
Operation Impacts									
Excessive groundwater abstraction	Groundwater bodies	Moderate	Operation	AoI	Reversible	Certain	Moderate	Medium	Moderate

5.5 Impact Mitigation & Residual Impact

This section presents mitigation measures and residual impacts to manage potential water related impacts during construction and operation. The mitigation measures have been identified based on the potential impacts identified above.

5.5.1 Mitigation during Construction

The assessment has shown that surface waters and groundwater could get contaminated from a wide range of sources linked to the construction of the Project. This section describes specific mitigation measures that will be implemented to prevent and minimise these construction impacts.

Preventative measures such as best practice site management and effective site planning/layout will be implemented to minimise the risk of any pollution incidents finding their way to the receptors. A range of remedial or suppressive methods will then also be applied to control these potential adverse activities.

Specific mitigation measures to avoid and/or mitigate the potential impacts on surface water and groundwater during construction phase will need to include the following:

- Accidental spill prevention through implementing of mitigation measures defined in this ESIA.
- Construction workers and relevant staff will be trained related to the implementation of good construction site practices and on spill response and prevention measures.
- Compliance with rules of material storage and use, waste storage and its timely removal.
- Suitably sized impervious bunds or other containment will be installed where hazardous materials are handled to prevent hazardous materials entering the site drainage.
- Use of the existing roads for material delivery.

- Work performed strictly within the construction site.
- Strict prohibition of vehicle washing and refuelling outside of the specially equipped places.
- Construction activities will be regularly inspected on site by the Project Company.
- Impermeable surfaces should be minimized, and the peak discharge rate of the runoff should be reduced (e.g., by using vegetated swales and retention ponds).
- In order to prevent direct or indirect impacts on stream beds, no intervention will be made the bed sections of the streams in the vicinity of the project site, bed sections will not be narrow, and activities will not be carried out to disrupt the flow regimes.
- During construction activities, the excavation residue will not be stored in the stream bed.
- All necessary measures will be taken to ensure that groundwater resources (springs, fountains, etc.) are not adversely affected in terms of quantity and water quality.
- Groundwater quality and groundwater table monitoring regime should be implemented regularly during the construction phase. The water will be sampled from the available groundwater wells around the Project site in 1 km distance from the boundary.
- No waste material, solid or liquid waste will be poured into the existing stream beds in the vicinity of the project site including ones with seasonal flowing, their cross-sections will not be narrowed, the existing and cadastral width of the stream beds will be preserved, excavation and filling will be carried out at least 20 meters from the slope tops on both banks of the streams, and the transfer of the excavation residue material and erosion residue material will be handled in a way that stream beds will not be effected.

In addition, as part of the construction phase, it is expected that significant amounts of dust will be created and re-settled. This process creates a substantial amount of material that will be mobilised through surface runoff and deposited in the drainage channels and surface water courses at points of particularly low flow, such as at culverts and reaches of thick vegetation. The siltation of the channels can cause flooding problems and reduce the volume of the drainage channels for transporting the resulting flow. The use of water as a dust suppression mechanism may further increase the sediment load entering the drainage channels and increase pressure on local resources. Dust related mitigation measures will be given in Section 7.5.2 as part of Air Quality Impact assessment.

5.5.2 Mitigation during Operation

The assessment has shown that groundwater levels could negatively affected due to excessive groundwater abstraction during operation phase of the Project. This section describes specific mitigation measures that will be implemented to prevent and minimise operation impacts on groundwater.

- Specific mitigation measures to avoid and/or mitigate the potential impacts on groundwater during operation phase will need to include the following: ,Relevant permits will be obtained from Regional Directorates of State Hydraulic Works.
- Groundwater abstraction will be done according to the amount which is allocated by the DSI or City Administration in order to prevent excessive withdrawal.
- Groundwater table monitoring regime will be implemented during the operation phase in case of grievances. The water will be sampled from the already available groundwater well which is currently used by the Çiçekliyurt village.

5.5.3 Residual Impacts

Residual impacts are those that remain after mitigation and/or enhancement measures have been implemented. A summary of impacts is presented below in Table 5.10. Although the

likelihood of the impacts will be greatly reduced with the application of mitigation, sensitivity of the receptors does not change.

However, the application of mitigation including best practice measures means that the impact of spillages, leaks and pollution is reduced to negligible. As this mitigation would remove the likely risk of an incident occurring that could affect water resources, any major spillages would be considered an emergency which would require implementation of the emergency spill response plan.

There should be no residual significant effects on surface water and groundwater quality caused by the Project after the implementation of appropriate mitigation measures.

Table 5.10: Summary of Residual Effects, After the Application of Mitigation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Use of Water Resources	Surface water bodies	Negligible	Negligible
	Groundwater bodies	Major	Minor
Water Quality Alteration	Surface water bodies	Negligible	Negligible
	Groundwater bodies	Moderate	Negligible
Alteration of Surface Water & Groundwater Interaction	Surface water bodies & Groundwater bodies	Moderate	Negligible
Excessive groundwater abstraction	Groundwater bodies	Moderate	Negligible

6 Land Use, Soil and Geology

6.1 Introduction

In this chapter, component of soil and geology related with the Project site is detailed and the potential impacts due to construction and operation phases of the Project are examined. Policy, and legislation related with soil, geology and their potential impacts are given in this chapter by taking into consideration national legislation as well as Lenders' standards and guidelines.

The geology and soils topic can typically comprise of several sub-topics, namely: geology resource (e.g., for minerals); soils as a resource; and also, the potential for impacts associated with land contamination that may arise through the disturbance of contaminants contained in the subsurface.

Information on the existing environments regarding baseline ground and soil conditions is provided in Section 6.3 of this chapter. Beside the examination of potential impacts, area of influence, mitigation measures, and any residual impact following mitigation are given in this chapter.

Project area is characterized by relatively flat plains, which can also be described as expanse of land that generally does not change much in elevation, with almost no rocky features. Moreover, there are parts of the agricultural area having trees and complex cultivation patterns. Therefore, impacts on land use and soil contamination have been scoped in within the scope the ESIA studies. Additionally, to be able to assess impacts of natural hazards such as erosion, landslides, and seismicity geology impacts were also scoped in as well.

6.2 Methodology

6.2.1 Applicable Guidelines and Standards

In addition to the national and international policy and legislation for the Project given in *Chapter 3: Policy, Legal and Institutional Framework*, policy and legislation which specifically relates to soil and geology are presented in this section.

6.2.1.1 National Requirements

Related national policy and legislations for the Project are given below:

Table 6.1: National Policy and Legislation Relating to Soils and Geology

Law/Regulation	Official Gazette (OG) date	OG number
Environmental Law (2872)	11.08.1983	18132
Regulation on Environmental Impact Assessment	29.07.2022	31907
Regulation on Environmental Audit	12.06.2021	31509
Regulation on Soil Pollution Control and Point-Source Contaminated Sites	08.06.2010	27605
Türkiye Earthquake Regulation for Buildings	18.03.2018	30364

Soil Contamination

The prevailing legislation in Türkiye relating to pollution prevention and control is the Law on Environment No. 2872[41], which sets out that polluters are liable for damages caused to the

[41] Official Gazette no/date: 18132/16.08.1983

environment and natural resources, and for compensation of such damages. Other relevant legislation under the Law on Environment includes the following:

- Regulation on Soil Pollution Control and Point-Source Contaminated Sites (Official Gazette date/number: 08.06.2010/27605): The regulation defines the principles and procedures to prevent the contamination of soil, to identify the sites where pollution exists or is likely to exist, and to remediate and monitor the contaminated sites. The generic limit concentrations of soil contaminants defined in the regulation are taken into account in assessment of soil pollution. The regulation requires all existing and proposed facilities which are included in Annex-2 Table 2 of the regulation to declare a “Preliminary Operation Information Sheet” to the Provincial Directorate of Environment Urbanization and Climate Change. The Provincial Directorate will then assess the sites with respect to the evaluation criteria given in Annex-4 of the regulation. If at least one of the criteria is valid for the subject site, it is characterized as a "Suspicious Site" that require further assessment.

6.2.1.2 International Requirements

Related international policy and legislations for the Project are given below:

Table 6.2: International Legislation and Policy Relating to Soils and Geology

Policy
EBRD Environmental and Social Policy and Performance Requirements (PR) (2019)
EU Directives European Commission Environmental Impact Assessment (EIA) Guidelines
Directive 2004/35/CE of The European Parliament and of The Council on environmental liability with regard to the prevention and remedying of environmental damage (2004)
IFC Performance Standards (PSs) on Environmental and Social Sustainability (2012)
IFC Sustainability Framework (updated in 2012)
Dutch Pollution Standards - Soil Remediation Circular 2013
IFC Environmental, Health, and Safety Guidelines Wind Power (2015)
World Bank Group Environmental, Health, and Safety General Guidelines (EHS General Guidelines) (2007)
IFC Good Practice Note: Managing Contractor’s Environmental and Social Performance (2017)

6.2.1.3 Project Standards

Within the scope of the Project, the guidelines and standards specified in Sections 6.2.1.1 and 6.2.1.2 will be complied with. In addition, for the soil sampling study conducted, the following Table 6.3 has been determined as Project Standards. It shall be noted that, national standards for the soil quality was selected as the threshold limits of “Contamination Groundwater” since it was assumed in *Chapter 5: Water Quality, Hydrology and Hydrogeology,* the main risk to be considered is pollution of soil and groundwater due to spills and contamination (According to the regulation, as the possible area of contamination is assumed to be less than 10 hectares, the dilution factor is determined as DF=10). Considering the fact that, contamination risk can be foreseen due to storage of chemicals and waste containing heavy metals, the relevant parameters were selected.

Table 6.3: Project Standards for Soil Quality

Parameter	Regulation on Control of Soil Pollution and Point Source Contaminated Sites Annex-1	Dutch Pollution Standards - Soil Remediation Circular Intervention Values
TOX	Baseline Level	Baseline Level
TPH	Baseline Level	Baseline Level
TVOCs	Baseline Level	Baseline Level

Parameter	Regulation on Control of Soil Pollution and Point Source Contaminated Sites Annex-1	Dutch Pollution Standards - Soil Remediation Circular Intervention Values
Arsenic	3 mg/kg DM	76 mg/kg DM
Cobalt	5 mg/kg DM	190 mg/kg DM
Barium	288 mg/kg DM	Baseline Level
Cadmium	27 mg/kg DM	13 mg/kg DM
Chromium (Total)	900000 mg/kg DM	78 mg/kg DM
Copper	514 mg/kg DM	190 mg/kg DM
Nickel	13 mg/kg DM	100 mg/kg DM
Lead	135 mg/kg DM	530 mg/kg DM
Vanadium	2556 mg/kg DM	250 mg/kg DM
Zinc	6811 mg/kg DM	720 mg/kg DM

6.2.2 Study Area and Area of Influence

Within the scope of the ESIA studies, an AoI is considered taking into consideration the methodology described in Section 4.6.2. To understand the direct and indirect impacts of the Project, sections of the Pelit WPP License Area where the wind turbines are planned to be located, access road and Energy Transmission Line (ETL) route had been considered. A 1 km buffer zone is determined.

6.2.3 Limitations and Assumptions

Available information about the Project has been limited to date; therefore, establishing the baseline was subject to limitations. Information which is not available at the time of writing this ESIA Report includes:

- Geotechnical Survey Report to be provided by the Project Company

Additionally, it has been assumed that Turbine Platform Areas will be 6,400 m^2 according to the Pelit WPP National EIA Report.

6.3 Baseline Conditions

The baseline status of land use, soil texture and geology of Project area have been examined in order to understand current Land Use and Land Cover (LULC) activities carried out on the Project area. Within this scope, information regarding the baseline status were obtained by examining the below listed documentation:

- Pelit WPP National EIA Report, 2018, En-Çev
- CORINE 2018 Land Cover Database (https://land.copernicus.eu/en/products/corine-land-cover)
- Google Earth Satellite Images
- Food and Agriculture Organization (FAO) Harmonized World Soil Database – The Digital Soil Map of the World Version 3.6 (https://data.apps.fao.org/map/catalog/static/search?keyword=DSMW)
- International Soil Reference and Information Centre (ISRIC) – World Soils Information Database (https://www.isric.org/)

6.3.1 Land Use

The LULC classification was done with the help of Google Earth Satellite Images, and CORINE 2018 Land Cover Database through desktop review.

The LULC was examined according to the land to be occupied as the Pelit WPP Licence area. This examination has shown that the Pelit WPP Licence area, which has a 17,116.56-hectare area, is mainly located on areas principally occupied by agriculture with significant areas of natural vegetation (Table 6.4). There is almost no built area on or nearby the Project area. Industrial and commercial activities are identified to be located far away from the Project area (Figure 6.1).

Table 6.4: Corine 2018 Land Use & Land Cover

Code	Land Use & Land Cover	Area(ha)	Percentage
211	Non-irrigated arable land	222.44	2.07%
231	Pastures	49.58	0.46%
243	Land principally occupied by agriculture with significant areas of natural vegetation	518.85	4.83%
321	Natural grasslands	339.19	3.16%
333	Sparsely vegetated areas	9,611.18	89.48%
Total		**10,741.25**	**100.00%**

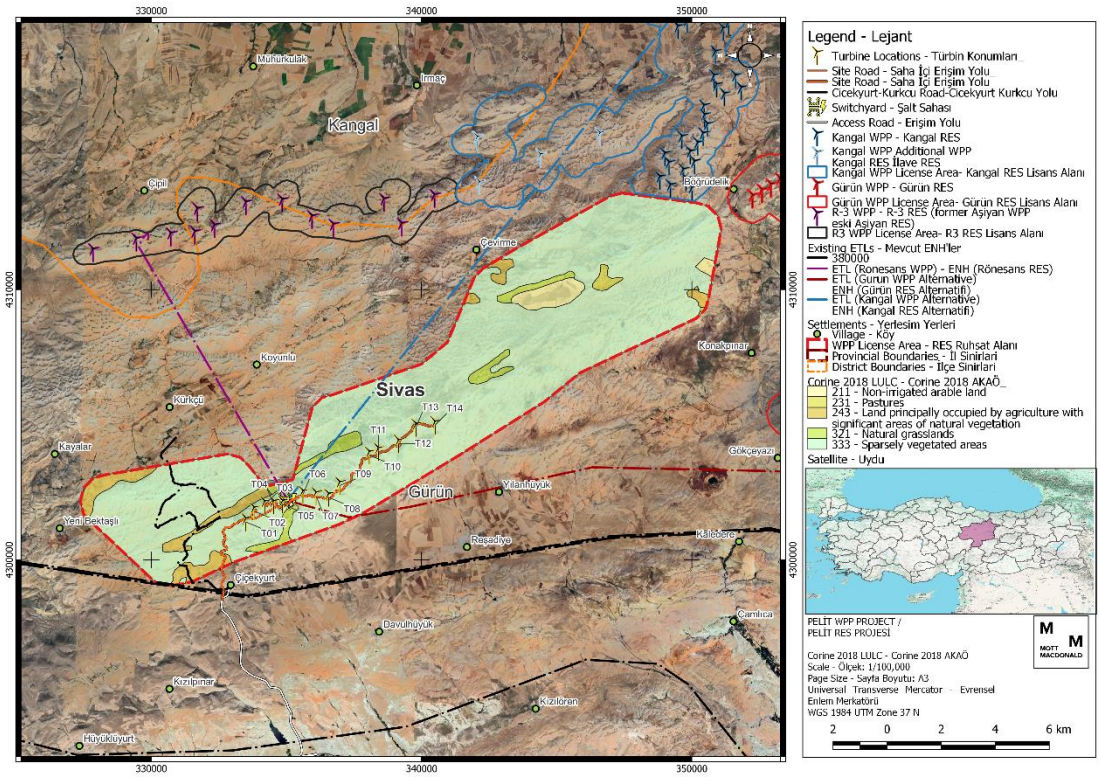


Figure 6.1: Corine 2018 LULC Map

Furthermore, the land use of the turbine locations was also examined via the National EIA Report prepared in 2018. Accordingly, it has been seen that majority of the land occupied by the turbines and switchyard is meadow pasture. Additionally, according to National EIA Report

prepared in 2018, the majority of the land use capability the turbine locations and switchyard to be constructed is Class VII and Class VIII.

The following list of land use capability classifications is provided by the Ministry of Agriculture and Forestry (Table 6.5) (Zanin, 2007).

Table 6.5: Land Use Capability (LUC) Classes Descriptions

Arability Status	Capability Class	Definition	Factors Restricting Agriculture
Agricultural lands suitable for soil cultivation	I	Numerous crop varieties can be grown there.	There are no or few restrictions.
	II	It is appropriate for the long-term production of many kinds of crops.	For soil and water loss, specific mitigating measures are needed.
	III	It is suitable for growing crops that offer unique mitigation methods. Typically, it requires extra attention when used for agricultural purposes.	Since it is prone to erosion, cultivation calls for artificial drainage.
	IV	Some unique agricultural crops can be grown with the right plowing. Typically, it requires extra attention when used for agricultural purposes.	The depth of the soil, the amount of stone, the humidity, and the incline all have significant restrictions.
Agricultural lands not suitable for soil cultivation	V	This category comprises stony, extremely wet, and even mildly sloped soils. These are unsuitable for cultivation and plowing. They are typically employed in forestry or grassland areas.	They don't have good drainage, and their structure isn't plow friendly.
	VI	Plowing and farming are ineffective here. They are mostly utilized as forestry and pastureland.	Because of the incline and shallow soil, there are some very substantial restrictions.
	VII	It is suitable for locations with weak pastures or areas undergoing afforestation but is not economically viable for agricultural activities.	Due to shallow soil, stone content, incline, and erosion, there are restrictions.
Non-arable lands	VIII	Plant life cannot grow there. It can be used as a place for relaxation or to safeguard wildlife.	No soil is present.

6.3.2 Soil

Soil texture properties of the Pelit WPP Licence Area are assessed via FAO Harmonized World Soil Database – The Digital Soil Map of the World Version 3.6. As it can be seen from Figure 6.2, dominant soil type at the Project area is *Calcic Xerosols*.

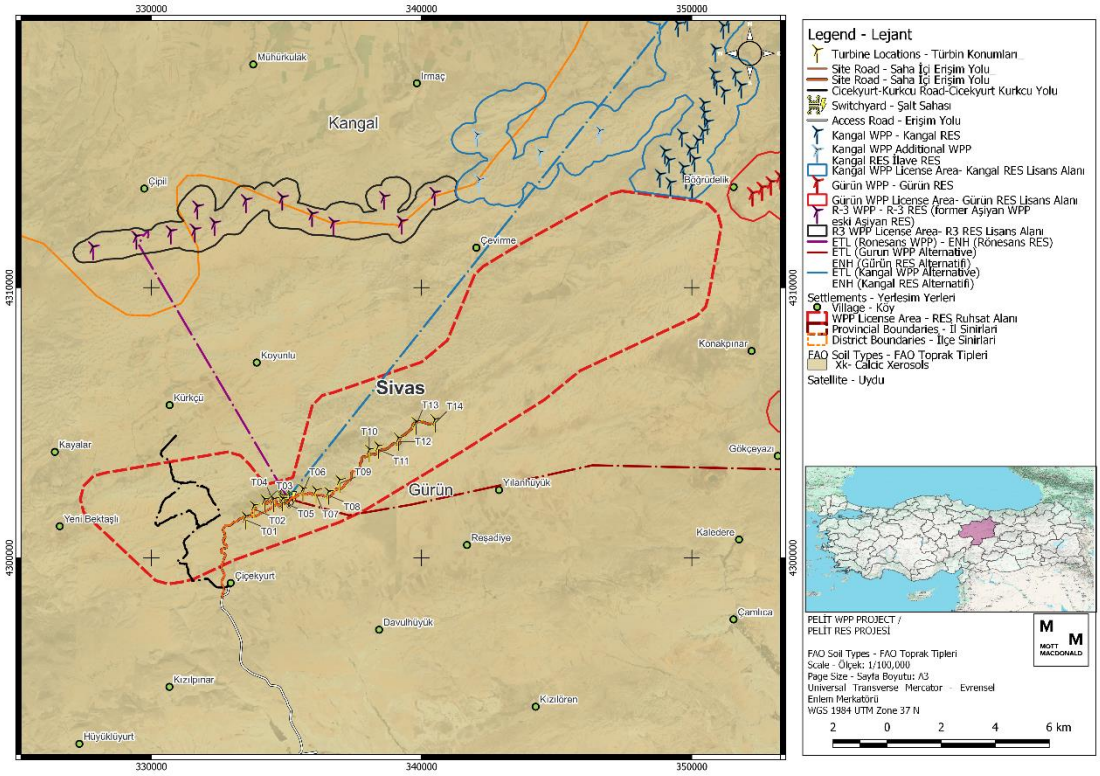


Figure 6.2: Soil Map of Pelit WPP Licence Area

Properties of *Calcic Xerosols* are described below.

According to World Reference Base for Soil Resources which is prepared by the FAO, Calcic horizon, which has a thickness of 15 cm or more, is the layer that secondary calcium carbonate ($CaCO_3$) accumulates dispersedly or in discontinuous concentrations. Xerosols have aridic moisture regime a weak ochric horizon. Xerosols lack permafrost within 200 cm of the surface. According to the FAO, Calcic Xerosols have a calcic horizon within 125 cm of the surface. Xerosols may be very fertile soils. Due to the lack of rainfall, Xerosols have limited value (or no value) for agriculture[42].

In addition, major soil groups of turbine and switchyard locations had been identified within the scope of the National EIA Report prepared in 2018. Accordingly, majority of the location has the Brown Soils. These soils are mostly found in arid and semi-arid climates. This soil type, which has good natural drainage, contains a lot of calcium in its profiles. Hardened lime accumulation is often seen under the subsoil. Additionally, a gypsum accumulation layer may exist beneath this. This information is also in consistency with the FAO classification. These soils remain dry for long periods in summer. In winter and spring, when precipitation is very low, since the temperature is low chemical and biological activities in the soil are slow except for short periods in spring and autumn.

The Consultant has carried out soil quality sampling analysis at area near the T1 location. The results of these analyses are presented in Table 6.6. As it can be seen from Table 6.6, the analysis results have been compared with the threshold values for transport of pollutants to groundwater and use of groundwater for drinking (mg/kg oven dry soil) of Regulation on Soil Pollution Control and Point Source Contaminated Sites (OG Dated: 08 June 2010, Numbered:

[42] Land Evaluation for Rainfed Farming, 1989, International Soil Reference and Information Centre

27605) and Dutch Soil Remediation Circular, Soil Contamination intervention values. Accordingly, all the parameters are in line with the national and Dutch standards.

Table 6.6: Soil Sampling Analysis Results

Parameters	Unit	Limit Value National Legislation	Limit Value Dutch Standards	Soil sample (Near to the T1) X: 41.07202 Y: 27.64634	Method
Total Organic Halogen (TOX)	mg/kg	_	_	35.6	Internal Method
Total Petroleum Hydrocarbons (TPH)	mg/kg	_	_	<100	TS EN 14039
TVOCs	mg/kg	_	_	<0.1	EPA 5021 A EPA 8260 D
Arsenic (mg/kg)	mg/kg	3 mg/kg DM	76 mg/kg DM	<0.1	EPA 3051 A EPA 6020 B
Barium (mg/kg)	mg/kg	288 mg/kg DM	190 mg/kg DM	53.7	EPA 3051 A EPA 6020 B
Cadmium (mg/kg)	mg/kg	27 mg/kg DM	Baseline Level	0.092	EPA 3051 A EPA 6020 B
Cobalt (mg/kg)	mg/kg	5 mg/kg DM	13 mg/kg DM	1.47	EPA 3051 A EPA 6020 B
Chromium (mg/kg)	mg/kg	900000 mg/kg DM	180 mg/kg DM	<0.1	EPA 3051 A EPA 6020 B
Copper (mg/kg)	mg/kg	514 mg/kg DM	190 mg/kg DM	1.05	EPA 3051 A EPA 6020 B
Nickel (mg/kg)	mg/kg	13 mg/kg DM	100 mg/kg DM	9.95	EPA 3051 A EPA 6020 B
Lead (mg/kg)	mg/kg	135 mg/kg DM	530 mg/kg DM	<0.1	EPA 3051 A EPA 6020 B
Vanadium (mg/kg)	mg/kg	2556 mg/kg DM	250 mg/kg DM	<0.1	EPA 3051 A EPA 6020 B
Zinc (mg/kg)	mg/kg	6811 mg/kg DM	720 mg/kg DM	<0.2	EPA 3051 A EPA 6020 B

6.3.3 Geology

According to the National EIA Report prepared for the Project, the Project area consists of Eocene aged clasts and carbonates, Middle Jurassic-Cretaceous and Middle Triassic-Cretaceous aged Neritic limestones, Permo-Carboniferous aged carbonates and occasional clastics.

There is an active landslide area located south of the Project with a distance of approximately 7.3 km as the crow flies. However, there are no active (or formerly active) slides or creeps within the project area.

Additionally, Sivas province consists of regions with 1st, 2nd, 3rd and 4th degree earthquake risk, whereas the Project area is located in the 4th degree earthquake risk area.

In order to understand and assess the geological features beneath the Project License area, a geotechnical report will be developed by the end of August 2024 as stated by the Project Company. Once the report will be completed, the Consultant will review the geotechnical report and the technical details of the report will be included in the assessment.

Erosion

According to the National EIA study, there are areas subject to erosion risk near to the Turbines T4 and T5 in west and southeast, respectively. Also, it has been found that high and very high risk of erosion can be found in the areas that will not go under construction.

Seismicity

Additionally, the earthquake risk was evaluated within the scope if the National EIA studies carried out in 2018. Accordingly, the Project area and its surroundings are located close to the 4th degree Earthquake Zone.

In addition to the National EIA Studies, peak ground acceleration (PGA) values of turbine locations were identified via Türkiye Earthquake Hazard Maps Interactive Web Application[43] (Figure 6.3). Accordingly, the PGA values of the Project components were determined to be varying from 0.102 to 0.109 (Table 6.7). According to the Türkiye Earthquake Hazard Map, PGA values between 0.1 and 0.2 is classified as 4th Degree Earthquake Zone. Thus, it can be said that the Project Area is located in 4th Degree Earthquake Zone (1st degree being the highest risk and 5th degree being the lowest risk).

[43] URL: https://tdth.afad.gov.tr/TDTH/main.xhtml (Last accessed on 22 April 2024)

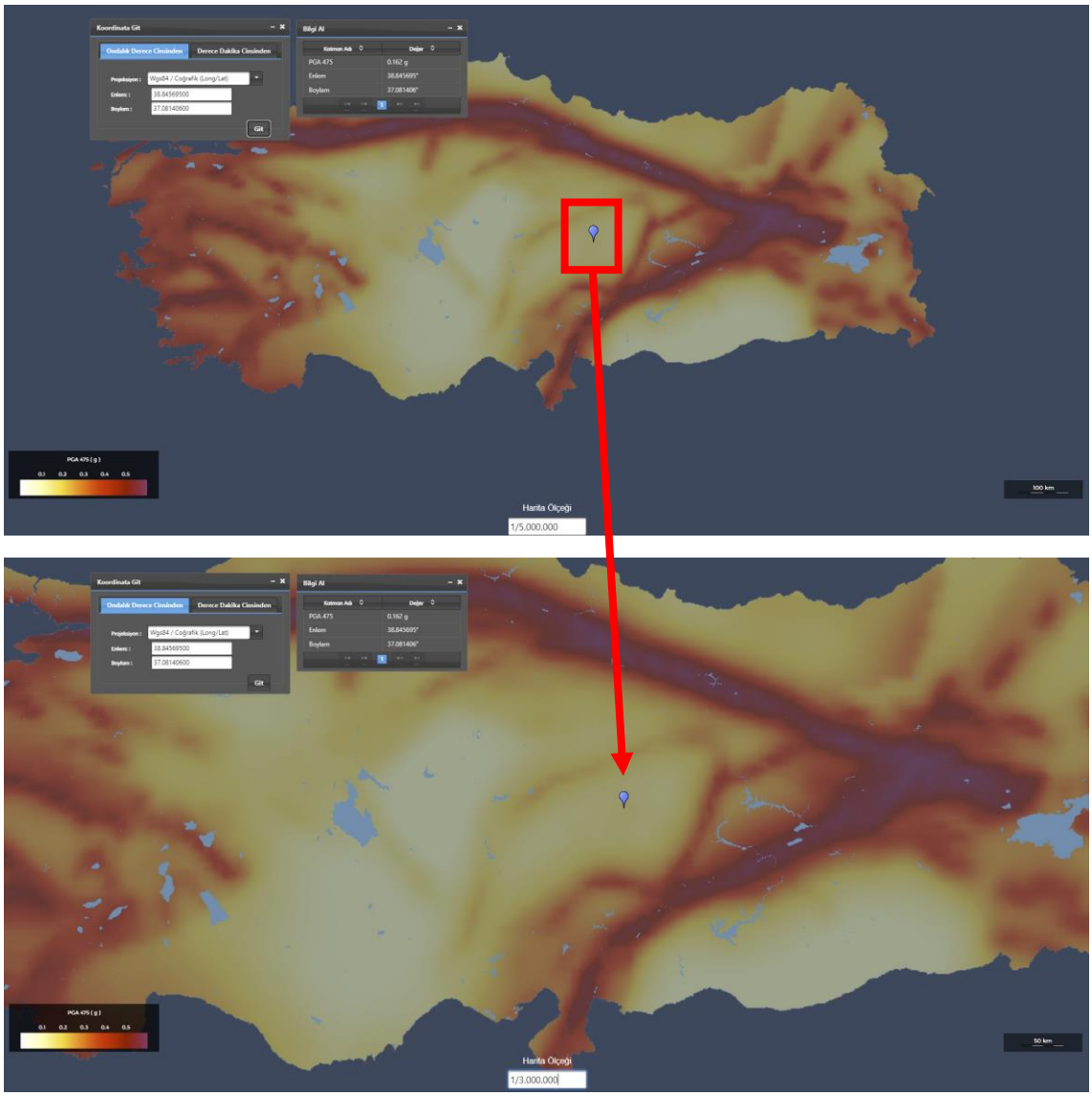


Figure 6.3: Hazard Risk Map (coordinates are showing location of T1)

Table 6.7: Peak Ground Acceleration Values for Wind Turbine and Switchyard Locations

Name	X	Y	PGA
T1	37.081406°	38.845695°	0.102
T2	37.084775°	38.849382°	0.102
T3	37.089269°	38.851537°	0.102
T4	37.093067°	38.851680°	0.103
T5	37.096889°	38.851841°	0.103
T6	37.105464°	38.855252°	0.104
T7	37.111074°	38.854856°	0.104
T8	37.116443°	38.854474°	0.105
T9	37.121074°	38.858477°	0.105
T10	37.133423°	38.868803°	0.107
T11	37.137240°	38.870054°	0.107

Name	X	Y	PGA
T12	37.145799°	38.872866°	0.108
T13	37.153081°	38.878343°	0.108
T14	37.161207°	38.879264°	0.109
Switchyard	37.099191°	38.852984°	0.103

Source: Türkiye Earthquake Hazard Maps Interactive Web Application (https://tdth.afad.gov.tr/TDTH/main.xhtml)

6.4 Impact Assessment

6.4.1 Construction

The proposed Project is anticipated to have direct and indirect impacts on land use within the Project area. The primary land use changes stem from the installation of wind turbines and the construction of access roads. The wind turbine installation will require clearings for their foundations, resulting in a temporary alteration of the land. The access road to be constructed to access to the WPP License Area, and site roads inside the WPP License Area while providing necessary infrastructure, will involve the opening of a new pathway through the existing terrain. Blasting activities is not anticipated since the Project area is characterized by relatively flat plains with almost no rocky features.

6.4.1.1 Impact on Land Use

Land loss, a significant concern associated with project development, is contingent upon the extent of land clearance required for turbine foundations and the access road. Preliminary evaluations indicate that the majority of the Project area possesses land use capability of Class VII or VIII of which explanations are provided in Table 6.8:

Table 6.8: Project area land use capability with definitions

Class	Definition	Factors Restricting Agriculture
VII	It is suitable for locations with weak pastures or areas undergoing afforestation but is not economically viable for agricultural activities.	Due to shallow soil, stone content, incline, and erosion, there are restrictions.
VIII	Plant life cannot grow there. It can be used as a place for relaxation or to safeguard wildlife.	No soil is present.

The area planned to be occupied due to the Project activities is summarised below.

Turbine Platform Area: It is a rectangular-shaped section with a depth of 0.3-1 m and only stripping excavation will be applied which will be used especially during the assembly phase of the turbine blades and tower parts. Locations of the Turbine Platform Areas were determined by taking into account the topographic condition of the ground and the size of the turbine blades. The areas in question are on average 6,400 m^2. This section is also the area, where topsoil and excess excavation material to be used for filling purposes after construction, are stored.

There are 14 wind turbines planned to be constructed. Thus, total approximate area to be occupied by the turbine platform areas are as follows:

$$\mathbf{6,400\ m^2 \times 14 = 89,600\ m^2}$$

Access Roads & Site Roads: It is expected to construct approximately 18.1 km of new access and site roads inside the License Area. Width of the roads are planned to be around 4 meters. As a result, the approximate total area to be occupied by the roads will be:

$$\mathbf{18,100\ m \times 4\ m = 72,400\ m^2}$$

Therefore, the total footprint of the Project area is calculated approximately as follows:

$$\mathbf{72,400\ m^2 + 89,600\ m^2 = 162,000\ m^2 = 162\ hectares}$$

For the supply of concrete material, the Project Company stated that concrete batching plant will be established in the Project area. The ready-mixed concrete and aggregate will be supplied from the ready-mixed concrete batching plants.

6.4.1.2 Impacts on Soil

The construction and operational phases of the Project pose potential threats to soil integrity, primarily arising from accidental spills and excavation activities during site preparation. Soil contamination is a distinct possibility, as spillages of construction materials or operational fluids may infiltrate the soil, compromising its quality and fertility. Construction equipment would need to be refuelled and some hazardous materials or wastes (such as waste paints and degreasing agents) may be generated. Accidental fuel spills or releases of hazardous materials could result in the exposure of vegetation at the project site, and reestablishment of the vegetation may be impacted or delayed because of residual soil contamination. However, after expected hazardous materials handling and refuelling requirements were met, only small spills or releases would be anticipated. The blasting activities, which have the potential to disturb the soil structure, leading to compaction and reduced permeability, is not anticipated in the scope of the Project.

Contamination Risk

The risk of soil contamination will be contingent upon the effectiveness of containment measures during material handling, storage, and transportation. In the event of accidental spills, the type and quantity of spilled substances will play a crucial role in determining the extent of soil contamination. The implementation of strict spill response protocols will be essential to mitigate potential adverse effects on soil quality.

Topsoil Stripping and Excavation Material Storage

The construction phase of the Project will necessitate the removal of the topsoil, approximately the top first 15-30 cm of the soil, from areas designated for turbine foundations and the access road. This topsoil stripping process is carried out to facilitate construction activities and expose the underlying terrain. The stripped topsoil will be temporarily stored to later reinstate the original soil composition after construction. The storage of excavation materials will also be a component of this process, with measures taken to prevent erosion or contamination during storage.

Within the scope of the Project, excess excavation material to be removed during the construction of the turbines will be temporarily stored in the turbine platform areas and reused in backfilling works.

After construction activities are completed, the stripped topsoil will be reinstated to the areas from which it was removed. This process is critical for the restoration of soil fertility and ecosystem functions.

6.4.1.3 Impact on Geology

The extent of seismicity and erosion requires careful assessment to gauge their impact on the stability and resilience of the area.

Seismicity Impact

Given the geological characteristics of the Project area, seismic events pose a potential risk. The installation of wind turbines and associated infrastructure may trigger ground vibrations, which, when coupled with existing seismic vulnerabilities, could lead to increased seismic activity.

Potential Geological Hazards

Geological hazards that could affect the construction and operation of a wind energy development site include landslides, rock falls and earthquakes. Earthquakes and volcanic activities happen in areas under specific geologic conditions and are determined by the local geology. Site construction activities can destabilize slopes if they are not conducted properly. Slope failures can occur naturally or be enhanced by slope modifications that change the local groundwater regimes and slope angles. In regions that have active earthquakes, heavy precipitation, or where geologic hazards are common, slope stability is sensitive to minor changes of landscape because of human intervention. Also, the water quality downslope of a failed slope can be adversely affected. During the construction phase, the activities that can potentially activate geological hazards include:

- Slope (or grade) increase resulting from site grading or construction of access roads;
- Toe-cutting at the bases of slopes for construction of on-site structures or access roads; and,
- Alteration of natural drainage patterns (e.g., alterations of slope or implementation of on-site storm water controls) or increase of precipitation infiltration (e.g., from clearing vegetation, backfilling with permeable materials, roadbed fracturing due to heavy vehicles) that can increase pore pressure, which weakens the strength of soils on slopes or causes accelerated soil erosion, thereby creating slope instability.

Soil Erosion

Apart from contamination and compaction, the construction activities may increase the vulnerability of the soil to erosion. The removal of vegetation and the disturbance of natural topography can expose the soil to the erosive forces of wind and water. Identifying erosion-prone areas and understanding the potential consequences on nearby ecosystems will be integral to this assessment.

The construction of the site roads and turbine foundations may expose the soil to increased erosion potential. The removal of vegetation and disruption of natural contours may exacerbate soil erosion, leading to sedimentation in nearby water bodies. The assessment will focus on identifying erosion-prone areas and estimating the potential sedimentation impacts on surrounding ecosystems. The activities that could contribute to soil erosion include:

- **Ground surface disturbance on site and along access roads:** Ground surface disturbance would occur during the construction or installation of site roads, wind tower pads, staging areas, lay-down areas, substations, transformer pads, underground cables, and other on-site structures. The extraction of geologic materials from borrow areas would also result in ground surface disturbance.
- **Heavy equipment traffic:** Heavy vehicles can disturb or destroy originally stable soil conditions and enhance soil erosion by both wind and surface runoff.
- **Surface runoff pattern disturbance:** Construction activities (e.g., grading and excavation) and the implementation of on-site storm water controls (e.g., culverts and drainage ditches along roads) could alter surface runoff patterns by diverting natural drainage into new areas and locally increasing runoff volume.

In conclusion, the impacts on land use, soil, and geology within the Project area necessitate a thorough analysis to comprehensively understand the potential consequences of the proposed WPP.

Erosion controls, such as drainage channels, will be applied prior to site preparation and building activities, as part of the necessary control measures to prevent erosion risk.

The waters from the Project surrounds and slopes will be captured via drainage channels along the road edges and turbine platforms. The design of these drainage channels will ensure they can effectively collect surface water flow, and they will connect to discharge points without causing erosion, thereby eliminating the risk of erosion during periods of high rainfall. Regular monitoring and necessary maintenance will be performed for these drainage channels and discharge points.

Following the excavation process, the slopes will be reinforced and all erosion control measures, including culvert outlets, will be put into place. Excavation material will be stored in a designated storage area with embankments around it to minimize soil erosion.

6.4.2 Operation

No significant impact had been foreseen due to the activities to be carried out during the operation phase of the Project. On this basis, it is intended that consideration of land use, soil, and geology impacts during the operational phase are scoped out for future assessment as part of the ESIA.

6.4.3 Summary

Assessment of impacts on land use, soils and geology is done based on the methodology presented in *Chapter 4: ESIA Scope and Methodology*. Accordingly, the magnitude of each impact is estimated as a factor of the foreseen: geographic extent, duration, reversibility, and frequency of the impact, based on expert's judgement. Sensitivity/value of the associated resource/receptor was determined in consideration of the baseline conditions described in the previous sections and typical descriptor of defined in Table 6.9. Specific sensitivity/value criteria considered in assessing the impacts on land use and soils is provided below.

Table 6.9: Land Use and Soil Sensitivity/Value Criteria for Resource/Receptors

Area of Concern	Receptor	High	Medium	Low	Negligible
Land Loss / Arable lands	Agricultural Lands Pasture Meadow Forest	Lands having land use capability of Class I-II	Lands having land use capability of Class III-IV	Lands having land use capability of Class V-VII	Lands having land use capability of Class VIII
Topsoil Loss	Topsoil	Lands having land use capability of Class I-II	Lands having land use capability of Class III-IV	Lands having land use capability of Class V-VII	Land with no topsoil
Soil (Erosion)	Soil	Very severe/severe erosion risk Receiving bodies soil erosion deposition area that feeds directly into sensitive watercourses	Moderate erosion risk Receiving bodies soil erosion deposition area that does not feed directly into sensitive watercourses	Low erosion risk Receiving bodies soil erosion deposition area is seasonal creeks	Negligible erosion risk Receiving bodies away from soil erosion deposition area

Area of Concern	Receptor	High	Medium	Low	Negligible
Soil (Contamination)	Soil	Nationally and internationally protected areas, areas with ecologically critical habitat status	Lands having national importance, Lands having Class I-II land use capability, residential areas	Lands having Class III-IV land use capability.	Lands having Class V-VIII land use capability, industrial and mining areas.
Seismicity/ Stability of Structures	Structures	1st and 2nd degree earthquake zone	3rd degree earthquake zone	4th degree earthquake zone	5th degree earthquake zone

Table 6.10: Magnitude of Impact on Land Use, Soil and Geology

Magnitude	Definition
Major	Continuous/long-term oil spills during construction activities on soils and during operation (e.g. accidents) (concentrations of pollutants in the soil defined in the Soil Pollution Control Regulations are exceeded to cause long term cancer and hazard risk) In case of disturbance of contaminated soils, increase contamination in nearby non-contaminated soils to above the background level that will be hazard to human health Major impacts on the integrity of structures and functionality of the Project (e.g. collapse of the buildings) during a seismic event. Soil stability issues leading to landslides Soil erosion process during construction that would lead to sediment loading into the sensitive receptors
Moderate	Continuous/long-term oil spills during construction activities on soils and during operation (e.g. accidents) (concentrations of pollutants in the soil defined in the Soil Pollution Control Regulations are exceeded above the generic contamination levels but below the long term cancer and hazard risk) In case of disturbance of existing contaminated soils: increase contamination in nearby non-contaminated soils to above the background level that is above the generic risk levels stated in the Soil Pollution Control Regulations but below long-term cancer and hazard. Moderate impacts on the integrity of structures and functionality of the Project (e.g. major cracks in the structures) during a seismic event. Soil stability issues leading to small settlements and Soil erosion process during construction that would lead to sediment loading into local waterways-drainage areas
Minor	Temporary small-scale oil spills during construction and operation (e.g. accidents) activities on soils that lead to contamination below generic contamination levels stated in the Turkish Regulation on Soil Pollution Control and Point Source Contaminated Sites (Soil Pollution Control Regulations) In case of disturbance of existing contaminated soils: increase contamination in nearby non-contaminated soils to above the background level but below the generic contamination levels stated in the Soil Pollution Control Regulations. Minor impacts on the integrity of structures and functionality of the Project (e.g. minor cracks in the structures) during a seismic event. Soil stability issues that do not cause health and safety risk concerns Soil erosion process during construction that would lead to small loading in the amount acceptable to the normal sediment loading process
Negligible	Temporary use of land (with soil surface) for the storage of excavated materials and construction equipment with no or little impact that is recoverable within a short time scale No earthquake impact No soil stability issue No soil erosion

Table 6.11: Summary of Impact Assessment

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Land Loss / Impacts on arable lands	Lands with Class VII LUC	Medium	Construction	Project footprint	Irreversible	Certain	Minor	Low	Minor
	Lands with Class VIII LUC	Medium	Construction	Project footprint	Irreversible	Certain	Negligible	Negligible	Negligible
Soil Contamination	Lands with Class VII LUC	Low	Construction	AoI	Reversible	Unlikely	Minor	Negligible	Negligible
	Lands with Class VIII LUC	Low	Construction	AoI	Reversible	Unlikely	Minor	Negligible	Negligible
Topsoil Stripping	Lands with Class VII LUC	Medium	Land Preparation	Project footprint	Reversible	Occurring regularly under typical conditions	Minor	Low	Minor
	Lands with Class VIII LUC	Medium	Land Preparation	Project footprint	Reversible	Occurring regularly under typical conditions	Minor	Low	Minor
Stability of Structures after Earthquake	Project Area Project Components	High	Construction	Regional	Reversible	Possible	Moderate	Low	Major
Stability of Structures after Soil Erosion	Areas with High and Very High Risk	Medium	Construction	AoI	Reversible	Possible	Moderate	High	Major
	Areas with Moderate and Low Risk	Medium	Construction	AoI	Reversible	Possible	Moderate	Medium	Moderate

6.5 Impact Mitigation & Residual Impact

6.5.1 Land Use

To effectively mitigate impacts on land use, the Project will adopt a hierarchical approach, beginning with avoidance and minimization strategies. It shall be noted that, majority of the significant impact had been avoided as the wind turbine locations were selected on the lands with the Class VII land use capability or lower. So, it can be said that majority of the significant impact had been avoided within the design process. Additionally, the access and site roads design will follow existing terrain contours, minimizing land clearance requirements.

Minimization efforts will involve adopting a careful design for the access road to reduce its impact on land use. This includes exploring alternative routes that avoid sensitive areas, utilizing existing infrastructure where possible, and implementing construction techniques that minimize the need for extensive land clearance. Within this scope it was aimed to use existing roads as much as possible. In addition, shortest paths were preferred as much as possible while deciding on road routes.

After construction, disturbed areas will undergo restoration through the implementation of rehabilitation plans. This involves reinstating topsoil and implementing erosion control measures

to restore the ecological functions of the land. Restoration efforts aim to return the land to a condition as close as possible to its pre-development state.

6.5.2 Soil

Mitigating impacts on soil quality involves a multi-faceted approach encompassing prevention, response, and restoration strategies. The hierarchy of mitigation will guide the Project in minimizing adverse effects on soil, responding promptly to incidents, and restoring soil quality after construction activities.

According to the Regulation on Control of Excavation, Construction, and Demolishing Wastes, which went into effect after being published in the Official Gazette dated 18.03.2004 and numbered 25406, stripped topsoil will be stored in areas within the Project area with slopes of no more than 5%.

The soil quality will be maintained and potential losses during topsoil storage will be avoided. Temporary storage places for topsoil will be set up so that vehicle movements will not impact the bulk material and its height does not exceed five meters. In this case, these regions will be marked, and at predetermined intervals, control and monitoring tasks will be completed.

Plants that grow quickly will cover the topsoil's surface if it is left exposed for an extended period. Following the topsoil removal, filling will occur concurrently, and topsoil will be temporarily stored for a brief period. Detailed information regarding the plants to be planted are presented in *Chapter 12: Biodiversity* in detail.

Preventive measures will be implemented to minimize the risk of soil contamination. Spill prevention plans will detail strict protocols for handling and transporting construction materials and operational fluids, reducing the likelihood of spills reaching the soil. Secondary containment systems will be deployed at storage areas as an additional preventive measure.

In the event of accidental spills, rapid response measures will be activated to contain and remediate the affected areas promptly. Response actions may include the deployment of absorbents, barriers, and specialized equipment to mitigate the spread of spilled substances and prevent further soil contamination.

Accidental spills and releases of hazardous materials and wastes could result in soil contamination throughout the Project's land preparation and construction phase. It is therefore impossible to estimate these accidental amounts before to the incident. Depending on the degree and type of contamination, different management and mitigation techniques will be used in the event that soil contamination occurs. However, prompt treatment of contaminated media is crucial for the effective management of soil contamination, as is developing an understanding of the source-pathway-receptor link in the event of an unintentional spill or leak. The following is a list of some essential measures.

- It is forbidden to release substances into the soil that could contaminate it.
- Leaks and spills that happen by accident will be controlled by putting emergency preparedness and response plans into action.
- By carrying out the relevant mitigation measures, solid wastes, concrete waste, hazardous wastes, and wastewater that will be produced as a result of land preparation and building activities will be further handled. Detailed description of the mitigation measures regarding waste and wastewater management are provided in *Chapter 11: Waste and Resources.*

A key component of soil impact mitigation involves adaptive management. Regular site observations, coupled with adaptive management strategies, will allow for adjustments to mitigation measures based on site observations made during the construction. This iterative

approach ensures continuous improvement in addressing soil impacts throughout the Project's lifecycle.

In addition, an Erosion Control Management Plan Including Drainage and Sediment Management Procedure for the Construction and Operation Phases should be developed..

6.5.3 Geology

Mitigating geological impacts involves a combination of avoidance, engineering solutions, and ongoing monitoring. The hierarchy of mitigation will guide the Project in avoiding high-risk geological zones, implementing engineering measures for stability, and continuously monitoring geological conditions for adaptive management.

To mitigate erosion and promote effective site rehabilitation after the installation of a WPP, several key measures should be implemented. First and foremost, establishing vegetative cover is crucial. Planting native grasses, shrubs, and trees helps stabilizing the soil, reducing the risk of erosion. These plants have deep root systems that anchor the soil and prevent it from being easily displaced by wind or water. Additionally, the use of erosion control blankets or mats can be employed on slopes to provide immediate protection and support the growth of vegetation. Details of this measure are specified in Biodiversity Management Plan.

Additionally, stormwater management is essential in erosion control management. In order to collect water coming from the surface, water drainage channels will be created at the edges of the road and turbine platforms. These open drainage channels will be connected to the existing facility's drainage channels and natural waterways in accordance with the topography. The cross-section and route of the drainage channels will be suitable for the surface water flow rate to be collected, and they will be connected to the discharge points in a way that will not cause erosion. The drainage channels and discharge points to be created will be constantly monitored, and maintenance and repair will be carried out when necessary.

Regular site observations and maintenance of erosion control measures are imperative for their long-term effectiveness. Conducting routine inspections to identify any signs of erosion or degradation allows for timely intervention. Additionally, conducting routine site inspections ensure proactive erosion management and risk reduction. In cases where erosion is detected, quick action will be taken to reinforce or replace erosion control measures as needed. Additionally, educating personnel and stakeholders about the importance of erosion control and rehabilitation measures fosters a collective commitment to maintaining the environmental integrity of the Project site.

Finally, incorporating soil stabilization techniques, such as the use of biodegradable erosion control blankets and soil-binding agents, can enhance erosion resistance. These measures create a protective layer over the soil, preventing erosion while facilitating the establishment of vegetation. By combining these mitigation strategies, wind power plant developers can ensure sustainable land use and minimize the environmental impact associated with the installation and operation of the facility.

In instances where geological impacts occur, rehabilitation measures will be implemented. This may include the restoration of slopes affected by erosion or landslides, the stabilization of disturbed areas, and the reestablishment of natural geological conditions where feasible.

Continuous monitoring of geological conditions will be conducted throughout the Project's lifecycle. Visual observation will be carried out and database of AFAD’s latest earthquakes list[44] will be controlled regularly to detect changes in soil conditions, subsurface stability, and potential seismic activity. Adaptive management strategies will be employed to adjust mitigation

[44] AFAD’s list of lates earthquakes (URL: https://deprem.afad.gov.tr/last-earthquakes)

measures in response to monitoring results. Moreover, during the activities to be carried out during construction of turbine foundations as well as other structures such as the administrative building, the provisions of Türkiye Building Earthquake Regulation (18.03.2018/30364) will be complied with.

6.5.4 Residual Impacts

Summary of the mitigation measures and the relevant residual impacts are provided below in Table 6.12.

Table 6.12: Mitigation Measures and Residual Impact

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Land Loss / Impacts on arable lands	Lands with Class VII LUC	Minor	Negligible
Land Loss / Impacts on arable lands	Lands with Class VIII LUC	Negligible	Negligible
Soil Contamination	Lands with Class VII LUC	Negligible	Negligible
Soil Contamination	Lands with Class VIII LUC	Negligible	Negligible
Topsoil Stripping	Lands with Class VII LUC	Minor	Negligible
Topsoil Stripping	Lands with Class VIII LUC	Minor	Negligible
Stability of Structures after Earthquake	Project Area Project Components	Major	Minor
Stability of Structures after Soil Erosion	Areas with High and Very High Risk	Major	Minor
	Areas with Moderate and Low Risk	Moderate	Negligible

7 Air Quality

7.1 Introduction

This chapter presents potential emission sources with respect to air quality, from the construction phase of the Project and assesses their impacts on local receptors and / or amenities. The assessment has been undertaken taking into account the requirements of national and international standards such as IFC and EBRD performance standards and guidelines and Regulation on the Control of Air Pollution Originating from Industry (RCAPOI).

As a renewable energy source, wind energy has fewer effects on air quality than fossil energy sources and that is why it may be considered as desirable energy source in terms of air quality aspect. However, some construction facilities of wind turbines such as earthwork, excavation, transportation of soil and materials may cause temporary fugitive dust emissions and engine emissions.

Construction phase emissions are handled in two categories:

- Earthwork activities: Earthwork activities generates fugitive dust emissions which occur from excavation of road routes and turbine areas, loading and unloading and transportation of excavation material,
- Engine emissions: During construction, a number of vehicles will be used resulting in combustion emissions. In addition, a mobile crushing plant will be used as well as diesel-fired generators on a need-basis.

The Project has the potential to affect air quality during the construction phase. The Project related air emissions during the construction phase will include particulate matter (PM) with an aerodynamic diameter of less than 10 and 2.5 microns (PM_{10}, $PM_{2.5}$)) due to earthworks and construction activities. It will also lead to emissions of oxides of nitrogen (NO_x), Sulphur Oxides (SO_x), VOC's, CO, PM_{10} and $PM_{2.5}$ emissions from construction equipment and construction vehicles.

The Project's operation is designed to have a minimal footprint on air quality. While routine activities will necessitate the use of security and maintenance vehicles, and the emergency backup generator will require periodic testing, these operations are strictly controlled to mitigate any potential air quality impacts. The limited number of vehicles and the short operating duration of the generator ensure emissions remain de minimis.

The Project will include an emergency generator for use in the administrative building. The generator will only be used during short-term power outages, resulting in approximately a few hours of use per year. Four vehicles will be used for Project operation, including maintenance, repairs, security, and personnel transportation. The low number of vehicles and the limited use of the generator indicate that emissions from these sources will be negligible. This aligns with the EHS Guidelines for Wind Energy published by the IFC, which states that "Wind energy facilities do not normally generate process emissions and effluents during their operation.

7.2 Study Area and Area of Influence

Project area is located in Sivas, Gürün district, Kürkçü, Koyunlu, Böğrüdelik, Yılanhöyük, Yenibektaşlı, Çiçekyurt, Kayalar and Konakpınar neighbourhoods,Behram and Çevirme Hamlets locations.. The study of determining the AoI aiming at the evaluation of air quality was carried out by evaluating various factors and standards. The main evaluations made for this purpose are:

- The distribution of the emission sources,
- The land uses and intensities of sensitive receiver types, and
- regulations and guidelines.

Another criterion to determine AoI is Turkish RCAPOI which was published in the Official Gazette dated 03 July 2009 and numbered 27277 and amended with the date 06 November 2020 and numbered 31296. The impact area defined in the RCAPOI for the modelling study suggests an area should be taken as square-shaped area with a side length of two km which is the minimum AoI.

Within the scope of the Project, emissions from point, areal, and linear sources arising from road and turbine construction activities are distributed heterogeneously in the field. Hence, examination areas have been established by separately evaluating each emission source based on its type. For linear sources, a two-kilometre area on both sides of the source has been designated as the impact area, while for areal sources, a two-kilometre radius area from the centre of the source has been defined as the impact area.

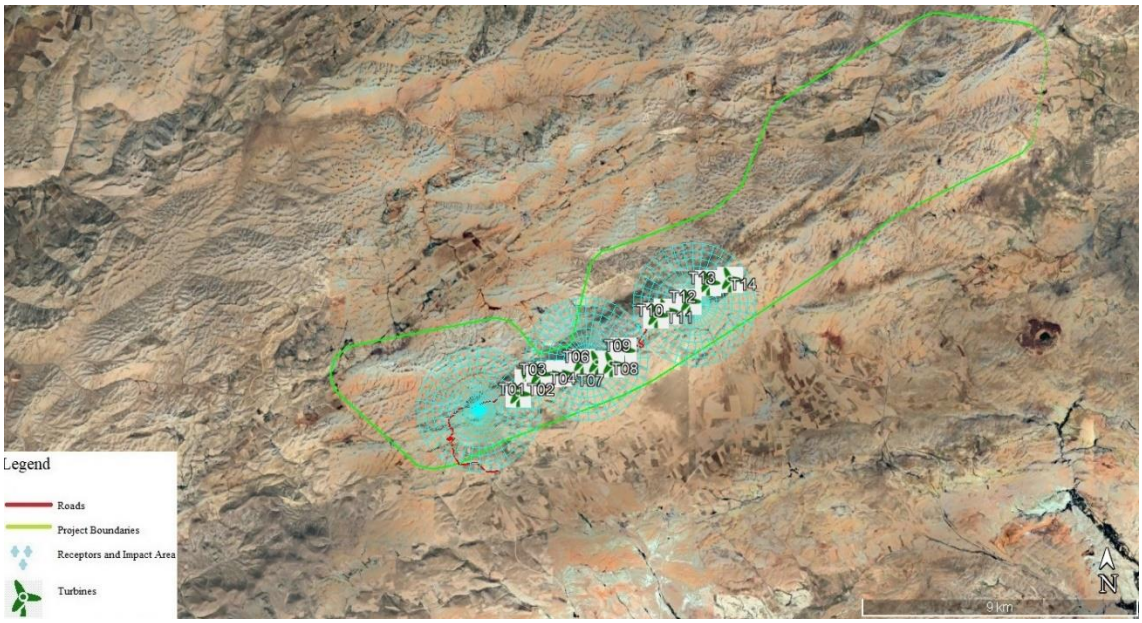


Figure 7.1: Impact Area Selected for the Air Quality Modelling Study

7.3 Methodology

The air quality impact assessment has been conducted through the following steps:

- **Establishment of baseline:** Ambient air quality conditions within the Project AoI have been identified by conducting baseline measurements. Detailed explanations of the baseline measurements conducted to assess ambient air quality conditions within the Project AoI are provided in Section 7.2.4. and Section 7.3.1.
- **Assessment of impacts:** Possible impacts related to air quality and emissions have been assessed together with their significance levels. The significance criteria adopted for the assessment of impacts is provided in Section 7.2.5. Impact assessment covers:
  - Assessment of deviation from baseline conditions: An air quality dispersion modelling study was carried out by using AERMOD View – Gaussian Plume Air Dispersion Model software to estimate Project emissions and their contribution to the baseline conditions for both construction and operation phases of the Project.

– Assessment of potential impacts on key receptors associated with construction and operation phases of the Project. Key receptors which are anticipated to be sensitive to changes in the existing air quality conditions on site are considered to include human health (nearby communities, businesses, Project employees), and ecological receptors.

- **Development of mitigation measures:** To reduce any significant impacts to an acceptable level and to identify good practice measures to minimise the overall environmental impact from associated with the Project.

The AERMOD model was employed in the air quality modelling study. AERMOD model, which was developed by United States Environmental Protection Agency (US EPA), is one of the most advanced computer models estimating hourly, daily and annual ground level concentrations (GLCs) on the basis of the real time values. The model enables the calculation of different dispersion models for different sources (point, volume, line) from isolated stacks to fugitive pollutants. Additionally, it can consider conditions like aerodynamic waves and turbulence. Latest version of the software (i.e., AERMOD 22112) which was released in April 2022 is used.

Hourly meteorological data for the modelling study were obtained from the Kangal Meteorological Station which is 34 km away from the project boundary run by General Directorate of Meteorology. In order to determine representative meteorological year, prevailing wind direction was determined for long term meteorological data from 1960-2022 meteorological bulletin and this data was compared with each year's prevailing wind directions. Result of this study meteorological data of 2019 were used for the modelling study. As a result of the modelling study, dispersion maps were generated for maximum daily and annual average emission dispersions of NO_2, SO_2, PM_{10}, $PM_{2.5}$ and dust deposition parameters for the construction phase.

7.3.1 Applicable Guidelines and Standards

There are a number of national requirements that the Project will have to comply with in addition to appropriate international lenders requirements. This section provides a brief overview of the applicable regulations and standards that will be applied to the Project.

7.3.1.1 National Requirements

Within the framework of national legislation, limit values for all kinds of industrial activities are given in the RCAPOI. Ambient air limit values are provided in Annex-2 Table 2.2 of RCAPOI and these limit values decrease gradually over the years until 2024. The limit values for key parameters in Table 12 of the RCAPOI are shown in Table 7.1.

Table 7.1: Limit Values Stipulated in the RCAPOI

Parameter	Period	Limit Value [µg/m³] [Deposition mg/m²day]						
		2014	2015	2016	2017	2018	2019-2023	2024 and later
PM_{10}	24 hours (not to be exceeded more than 35 times a calendar year)	100	90	80	70	60	50	50
	Annual	60	56	52	48	44	40	40
$PM_{2.5}$	24 hours	-	-	-	-	-	-	-
	Annual	-	-	-	-	-	-	-
NO_2	Hourly (not to be exceeded more than 18 times a calendar year)	300	290	280	270	260	250	200

Parameter	Period	Limit Value [µg/m³] [Deposition mg/m²day]						
		2014	2015	2016	2017	2018	2019-2023	2024 and later
	Annual	60	56	52	48	44	40*	40
SO_2	Hours (not to be exceeded more than 24 times a calendar year)	500	470	440	410	380	350	350
	24 hours (not to be exceeded more than 3 times a calendar year)	250	225	200	175	150	125	125
	Annual	60	60	60	60	60	60	60
Dust Deposition	Short Term	390	390	390	390	390	390	390
	Long Term	210	210	210	210	210	210	210

7.3.1.2 International Requirements

IFC Requirements

The IFC provide a portfolio of Standards and Guidelines that should be adhered to for any project seeking IFC finance. The IFC PS 3: Resource Efficiency and Pollution Prevention[45] aims:

"To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities"

To achieve this, the IFC provides both industry-specific and general guidance on GIIP with respect to ambient air quality and emissions to air. The Project will need to comply with the IFC Performance Standards, and the standards set out in the IFC EHS General Guidelines[46].

The IFC General EHS Guidelines advise that 'relevant standards' with respect to ambient air quality are national legislated standards or, in their absence, the current World Health Organisation (WHO) Air Quality Guidelines or other internationally recognised sources. As Türkiye has its own nationally legislated standards, as described above, these have been used to determine significance of potential ambient impacts.

The IFC General EHS Guidelines suggest that, as a general rule, emissions should not contribute more than 25 percent of the relevant air quality standards to allow additional, future sustainable development in the same airshed. Therefore, the significance of the impact of the Project has been discussed in the context of this approach.

EBRD Requirements

The Project has been assessed against the guidance provided by the EBRD Environmental and Social Policy PR3: Resource Efficiency and Pollution Prevention Control[47] the objectives of which are:

"adopt the mitigation hierarchy approach to addressing adverse impacts on human health and the environment arising from the resource use and pollution released from the project"

[45] International Finance Corporation Performance Standard 3: Resource Efficiency and Pollution Prevention 2012

[46] International Finance Corporation, World Bank Group, General Environmental Health and Safety Guidelines (2008)

[47] European Bank for Reconstruction and Development, Environmental and Social Policy 2019

PR3 refers to EU substantive environmental standards[48] and requires projects to be structured so that these can be applied at the project level.

"When host country regulations differ from the levels and measures presented in EU substantive environmental standards or other appropriate environmental standards identified, projects will be required to meet whichever is more stringent."

PR3 also states "The client will structure the project to meet relevant EU substantive environmental standards, where these can be applied at the project level". It further clarifies how this should be implemented and confirms "For the purpose of this PR, EU substantive environmental standards can be applied at the project level where the EU secondary legislative document itself contains clear quantitative or qualitative requirements that are applicable at the project level (as opposed to, e.g., ambient level)."

On this basis the national ambient air quality standards are the primary standards applicable to the Project.

7.3.1.3 Project Standards

The limit values determined for the project in accordance with national legal requirements are as summarized in Table 7.2 in addition to EU limit values which have been used to supplement national standards where specific averaging periods are not included.

Table 7.2: Air Quality Standards

Parameter	Averaging Period	Turkish Limit Values (1) (µg/m³)	EU Limit Values (2) (µg/m³)	Project Standards
PM_{10}	24 hours	50 (not to be exceeded more than 35 times a year)	50 (not to be exceeded more than 35 times a year)	50
	Annual	40	40	40
$PM_{2.5}$	24 hours	-	-	-
	Annual	-	20	20
NO_2	Hourly	200 (not to be exceeded more than 18 times a calendar year)	200 (not to be exceeded more than 18 times a calendar year)	200
	Annual	40	40	40
SO_2	Hourly	350 (not to be exceeded more than 24 times a calendar year)	350 (not to be exceeded more than 24 times a calendar year)	350
	24 hours	125	125 µg/m³, not to be exceeded more than 3 times a calendar year	125
	Annual	20	-	20
Dust Deposition (mg/m².day)	Short Term	390	-	390
	Long Term	210	-	210

(1) Annex-2 Table 2.2 of RCAPOI
(2) EU Council Directive "2008/50/EC

7.3.2 Limitations and Assumptions

Air quality measurements have been classified according to the receptor environment characterization, considering the size of the Project area. Representative points have been identified, assuming that they represent the entire region with similar characterization.

[48] Substantive environmental standards of the EU are comprised in EU secondary legislation, e.g., regulations, and directives. Procedural norms directed at Member States and EU institutions and the jurisprudence of the European Court of Justice and the Court of First Instance which applies to Member States, EU institutions and EU legal and natural persons, are excluded from this definition.

It is assumed that during excavation operations, material removal will be carried out by truck with a capacity of 10 m³. Additionally, it is assumed that heavy machinery will consume fuel at a rate of 25 liters per hour. Within the scope of the Project, it is anticipated that the construction activities will span 100 days, and work will be conducted for 8 hours per day.

7.3.3 Baseline Measurement Methodology

Project specific baseline monitoring has been undertaken to support the assessment. When determining the baseline air quality sampling locations, care was taken to identify points that would represent all receptors. The measurement point selections were carried out taking into account factors such as the distribution of emission sources of the Project, the distance of sensitive receptors to emission sources, in particular emission quantity and exposure duration, the similarity of receptors to each other, and their representational capacity. As mentioned in the previous section, the study area includes various sensitive receptors such as settlements and agricultural lands. Due to the extensive coverage of the Project area and the technical impracticality of sampling at all receptors within this area, representative locations suitable for each receptor type have been identified. As a general approach, it was considered that the background emissions of nearby settlements with similar demographic and geographical characteristics would be similar, and a single measurement location was determined for nearby settlements. A single sampling location was also determined for geographically similar areas in agricultural lands.

When determining these locations, the following factors were taken into account based on the receptor type:

1. Settlements: Representative sampling points were identified for the settlements within the study area, where demographic and geographic factors are similar for receptors. For settlements that are close to each other, they often have similar demographic structures, and if there is geographic similarity, emission sources also exhibit similarity. In such cases, it is expected that background emissions would represent each other.

2. Agricultural areas: In agricultural lands, emissions from agricultural activities are possible. In addition, factors such as long-range and transboundary dust emissions and forest fires can also affect the emission levels in these areas. Due to all these factors in forest and agricultural lands with similar geographic structures, similar emissions are expected to occur. Therefore, when determining emission sampling locations, locations representing the receptor type as a whole have been identified.

Monitoring was undertaken for NO_2, SO_2, PM_{10}, $PM_{2.5}$, and dust deposition parameters. NO_2 and SO_2 measurements were conducted at five location and dust deposition measurements were conducted at three locations for 30 days – 2 period (total 60 days) between the dates 8 March 2024-7 April 2024. PM_{10} and $PM_{2.5}$ measurements were carried out at seven different locations for 30 days between 26 December 2023 and 25 January 2024 for each around the Project area. Measurement devices are designed to sample dust (PM_{10} and $PM_{2.5}$) in ambient air.

7.3.3.1 Overview

Considering the characteristics of the emission sources in the Project timeline, the modelling study was carried out for the construction phase.

In order to determine construction phase emission impacts, emissions were calculated by using emission factors and an air quality modelling study was carried out by using *AERMOD,* which is the *US EPA's* regulatory model.

AERMOD model is one of the most developed computer models estimating hourly, daily and yearly GLC's on the basis of the real time values. Model comprises the calculations of different dispersion models for different sources (point, volume, line) from isolated stacks to fugitive pollutants. Additionally, it considers conditions like aerodynamic waves and turbulence.

Emission dispersions are calculated by using hourly meteorological data which covers all hours of one year meaning all best and worst meteorological conditions are considered in the modelling study for the Project area.

AERMOD model works in a network system defined by the user and calculations are made for corner points of each receiving environment segments forming the network. The network system used by AERMOD model can be defined as polar or Cartesian. Additionally, detailed calculations can be made at the discrete receptor points, which can be determined out of the network system. In the dispersion calculations, Planetary boundary layer theory is used. In the model, there is also an option for hilly areas.

7.3.3.2 Construction Phase Emissions

The land preparation and construction phase activities cover the land arrangement (land preparation and excavation) activities of the roads and turbine area. Significant pollutant of this step will be dust generated from excavation, loading and unloading on trucks and vehicle movements. No greenhouse gases will be emitted by construction activities except engine emissions.

Used Emission Factors in Calculations

In order to calculate dust and engine emissions, emission factors were used. There will be two main construction activities during the project as road construction and turbine platform construction.

As mentioned in the previous section, dust emissions resulting from excavation, loading/unloading to trucks, and vehicle movements will occur during construction activities. The emission factors provided in the literature for these activities and used in calculations for the project are as follows.

Excavation

Particulate related emissions from excavation are calculated by emission factors derived from US EPA AP-42 Section 11. Western Surface Coal Mining Table 11.9-2. These emission factors are shown below. Moisture content of the material are obtained from Table 11.9-3 of the same document:

$$E_{PM10} = \frac{0.0029(d)^{0.7}}{(M)^{0.3}} \; x \; 0.75$$

$$E_{PM2.5} = \frac{0.0046(d)^{1.1}}{(M)^{0.3}} \; x \; 0.017$$

Where;

$E_{PM10}/_{PM2.5}$	: Emissions of $PM_{10}/PM_{2.5}$ (kg/m^3)
d	: drop height (as average 2 meter was used)
M	: Moisture content (7.9 % was used)

According to these equations, excavation emission factors are calculated as follow;

$$E_{PM10} = \frac{0.0029(2)^{0.7}}{(7.9)^{0.3}}\ x\ 0.75 = 0,0019\ kg/m^3$$

$$E_{PM2.5} = \frac{0.0046(2)^{1.1}}{(7.9)^{0.3}}\ x\ 0.017 = 0,00009\ kg/m^3$$

Within the scope of the Project, regular irrigation will be conducted to reduce emissions resulting from excavation activities during the construction phase. Emissions Inventory Guidance Mineral Handling and Processing Industries[49] states in section VI-D that emission measures in these activities provide a 75% reduction. Therefore, in the modelling study, a value of

E_{PM10} = 0. 0019 kg/m^3 × 0.25 = 0. 000475 kg/m^3 and

$E_{PM2.5}$ = 0. 00009 kg/m^3 × 0.25 = 0. 0000225 kg/m^3 has been used.

Loading/Unloading to trucks

Particulate related emissions from excavation are calculated by emission factors derived from US EPA AP-42 Section 11. Western Surface Coal Mining Table 11.9-2. These emission factors are shown below. Moisture content of the material are obtained from Table 11.9-3 of the same document.

$$E_{PM10} = \frac{0.0596}{(M)^{0.9}}\ x\ 0.75$$

$$E_{PM2.5} = \frac{0.580}{(M)^{1.2}}\ x\ 0.019$$

Where;

$E_{PM10}/_{PM2.5}$	: Emissions of $PM_{10}/PM_{2.5}$ (kg/ton)
M	: Moisture content (7.9 % was used)

According to these equations, excavation emission factors are calculated as follow;

$$E_{PM10} = \frac{0.0596}{(7.9)^{0.9}}\ x\ 0.75 = 0.0069\ kg/ton$$

As material density is 1.5 ton/m^3

$$E_{PM10} = 0.0046\ kg/m^3$$

$$E_{PM2.5} = \frac{0.580}{(7.9)^{1.2}}\ x\ 0.019 = 0.00092\ kg/ton$$

As material density is 1.5 ton/m^3

$$E_{PM2.5} = 0.00061\ kg/m^3$$

In order to reduce dust emissions from the loading and unloading activities, regular irrigation will be conducted. Mojave Desert Air Quality Management District Antelope Valley Air Pollution Control District Emissions Inventory Guidance Mineral Handling and Processing Industries is

[49] Emissions Inventory Guidance Mineral Handling and Processing Industries, Mojave Desert Air Quality Management District Antelope Valley Air Pollution Control District, April 2020.

stated in section VI-D Table-5 that emission measures in these activities provide a 75% reduction.

E_{PM10} = 0.0046 kg/m^3 × 0.25 = 0.00115 kg/m^3

$E_{PM2.5}$ = 0.00061 kg/m^3 × 0.25 = 0.0001525 kg/m^3 has been used.

Vehicle Movements (Transportation)

Emissions from transportation of raw material are calculated by emission factors derived from *The EMEP/EEA Air Pollutant Emission Inventory Guidebook 2019-Quarrying and mining of minerals other than coal- Section 3.3.3 Internal Transport* document for unpaved roads. These emission factors are shown below.

$$E_{PM10} = k_{PM10} \times \left(\frac{s}{k_s}\right)^{0.9} \times \left(\frac{W_{dumper}}{k_W}\right)^{0.45} \times d_{unpaved} \times \left(1 - \frac{p}{k_{day}}\right) \times (1 - ER)$$

$$E_{PM2.5} = k_{PM2.5} \times \left(\frac{s}{k_s}\right)^{0.9} \times \left(\frac{W_{dumper}}{k_W}\right)^{0.45} \times d_{unpaved} \times \left(1 - \frac{p}{k_{day}}\right) \times (1 - ER)$$

Where;

$E_{PM10}/_{PM2.5}$	: Emissions of $PM_{10}/PM_{2.5}$ (kg/h)
S	: Silt content (3.9% was used)
W_{dumper}	: Dumper weight (40 ton was used)
$d_{unpaved}$	: Total distance (approx. use of 1 km per hour)
ER	: Abatement factor (0)
p	: Number of days per year with at least 0.254 mm natural precipitation (average 143 days was used)
k_{PM10}	: 0.422 (kg/km)
$k_{PM2,5}$	: 0.042 (kg/km)
k_w	: 2.72 (t)
k_s	: 12
k_{day}	: 365

According to these equations, vehicle movement emissions factors are calculated as follows;

E_{PM10} = 0.422 x $(3.9/12)^{0.9}$ x $(40/2.72)^{0.45}$ x 1 x (1-143/365) = 0.313 kg/h

When it is assumed that and each truck carries 10 cubic meters of material, the emission factor will be as follows.

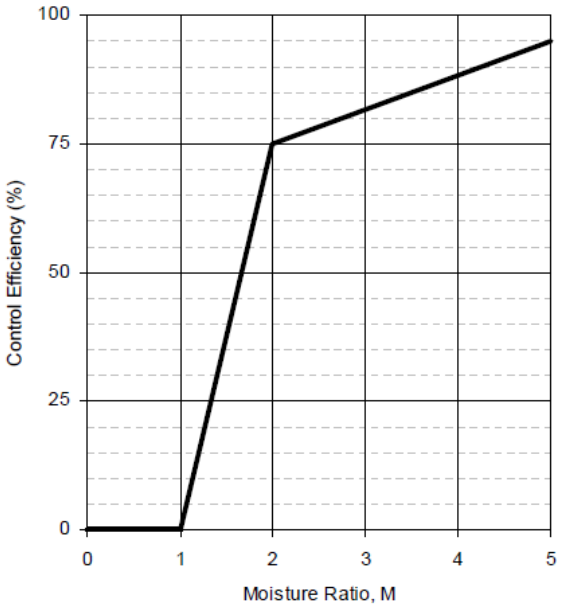
E_{PM10} = 0.313 kg/h / 10 m^3/h =0.0313 kg/m^3

$E_{PM2,5}$= 0.0422 x $(3.9/12)^{0.9}$ x $(40/2.72)^{0.45}$ x 1 x (1-143/365) = 0.0313

When it is assumed that and each truck carries 10 cubic meters of material, the emission factor will be as follows.

$E_{PM2.5}$ = 0.0313 kg/h / 10 m^3/h =0.00313 kg/m^3

In order to reduce dust emissions, haul roads will be regularly watered. In the in Figure 13.2.2-2 of the relevant document emission factors were taken, the dust reduction efficiency achieved by road watering is provided as follows.



Transportation roads will be regularly watered to ensure a constant moisture level above 5%. This will result in an emission reduction value of 95%. After emission measures, emission factors will be,

E_{PM10} = 0.0313 kg/m^3 × 0.05 = 0.0015 kg/m^3 and

$E_{PM2.5}$ = 0.00313 kg/m^3 × 0.05 = 0.00015 kg/m^3 has been used.

Overall emission factor

Since all emission factors obtained in the calculations above are in the same unit and will be applied to the total excavation quantity, they have been combined into a single emission factor. This unified emission factor has been used in the calculations. The combined emission factor has been calculated as follows.

$TOTAL_{EPM10}$ = $Excavation_{EPM10}$ + $Loading_{EPM10}$ + $Transportation_{EPM10}$ + $Unloading_{EPM10}$

$TOTAL_{EPM10}$ = 0.000475 kg/m^3 + 0.00115 kg/m^3 + 0.0015 kg/m^3 + 0.00115 kg/m^3

$TOTAL_{EPM10}$ = 0.004275 kg/m^3

$TOTAL_{EPM2.5}$ = $Excavation_{EPM2.5}$ + $Loading_{EPM2.5}$ + $Transportation_{EPM2.5}$ + $Unloading_{EPM2.5}$

$TOTAL_{EPM2.5}$ = 0.0000225 kg/m^3 + 0.0001525 kg/m^3 + 0.00015 kg/m^3 + 0.0001525 kg/m^3

$TOTAL_{EPM2.5}$ = 0.0004775 kg/m^3

Road Construction Emissions

The road construction emissions calculated based on the emission factors obtained from the calculations in the previous section are presented in Table 7.3.

Table 7.3: Road Construction Emissions

Road Name	Excavation Area (m^3)	Fill Area (m^3)	Total Area (TA) (m^3)	EF (kg/m^3)		Working Period (WP)	Emissions (EF x TA / WP) (kg/h)	
				PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Road-A	33907.0	18682.0	52589.0	0.004275	0.0004775	100 days x 8 hours/day = 800 hours	0.2810	0.0314
Road-T01	9723.0	3380.0	13103.0				0.0700	0.0078
Road-T01-Bom	255.0	5407.0	5662.0				0.0303	0.0034
Manoeuvre-T01	4.0	439.0	443.0				0.0024	0.0003
Road-B	7008.0	17169.0	24177.0				0.1292	0.0144
Road-C-1.Part	3869.0	2023.0	5892.0				0.0315	0.0035
Road-T02	1707.0	228.0	1935.0				0.0103	0.0012
Road-T03	45.0	5805.0	5850.0				0.0313	0.0035
Road-T04	62.0	2715.0	2777.0				0.0148	0.0017
Road-T04-Bom	978.0	68.0	1046.0				0.0056	0.0006
Road-T05-1.Part	712.0	17.0	729.0				0.0039	0.0004
Manoeuvre-1	1065.0	456.0	1521.0				0.0081	0.0009
Road-C-2.Part	17810.0	16601.0	34411.0				0.1839	0.0205
Road-T05-2.Part	378.0	1177.0	1555.0				0.0083	0.0009
Road-T07-Bom	319.0	165.0	484.0				0.0026	0.0003
Road-T08-Bom	1089.0	2104.0	3193.0				0.0171	0.0019
Road-T-09	47.0	6402.0	6449.0				0.0345	0.0038
Manoeuvre-2	117.0	240.0	357.0				0.0019	0.0002
Road-D	25760.0	19086.0	44846.0				0.2396	0.0268
Road-T-10-Bom	343.0	198.0	541.0				0.0029	0.0003
Road-T10	860.0	81.0	941.0				0.0050	0.0006

Road Name	Excavation Area (m^3)	Fill Area (m^3)	Total Area (TA) (m^3)	EF (kg/m^3)		Working Period (WP)	Emissions (EF x TA / WP) (kg/h)	
				PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Road-T11-Bom	1513.0	13.0	1526.0				0.0082	0.0009
Road-T11	2148.0	115.0	2263.0				0.0121	0.0014
Road-T12-Bom	1143.0	435.0	1578.0				0.0084	0.0009
Road-T12	1100.0	458.0	1558.0				0.0083	0.0009
Manoeuvre-3	22.0	711.0	733.0				0.0039	0.0004
Road-E	11931.0	6156.0	18087.0				0.0967	0.0108
Road-F	6010.0	4083.0	10093.0				0.0539	0.0060
Road-T14	3.0	4202.0	4205.0				0.0225	0.0025
Road-T16	3437.0	3054.0	6491.0				0.0347	0.0039

Turbine Construction Emissions

The road construction emissions calculated based on the emission factors obtained from the calculations in the previous section are presented in Table 7.4.

Table 7.4: Turbine platform construction emissions

Road Name	Excavation Area (m^3)	Fill Area (m^3)	Total Area (TA) (m^3)	EF ($kg/m^{3)}$		Working Period (WP)	Emissions (EF x TA / WP) (kg/h)	
				PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Platform T01 (T01)	11539	7811	19350				0.1034	0.0115
Platform T02 (T02)	3083	4247	7330				0.0392	0.0044
Platform T03 (T03)	5345	4465	9810				0.0524	0.0059
Platform T04 (T04)	8380	2414	10794	0.004275	0.0004775	100 days x 8 hours/day = 800 hours	0.0577	0.0064
Platform T05 (T05)	3942	4671	8613				0.0460	0.0051
Platform T07 (T06)	5909	5281	11190				0.0598	0.0067
Platform T08 (T07)	4281	13380	17661				0.0944	0.0105

Road Name	Excavation Area (m^3)	Fill Area (m^3)	Total Area (TA) (m^3)	EF (kg/m^3)		Working Period (WP)	Emissions (EF x TA / WP) (kg/h)	
				PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Platform T09 (T08)	13055	5057	18112				0.0968	0.0108
Platform T10 (T09)	12294	3261	15555				0.0831	0.0093
Platform T11 (T10)	7928	15609	23537				0.1258	0.0140
Platform T12 (T11)	3696	6505	10201				0.0545	0.0061
Platform T14 (T12)	9974	6479	16453				0.0879	0.0098
Platform T16 (T13)	8184	10172	18356				0.0981	0.0110
Platform T18 (T14)	14587	15774	30361				0.1622	0.0181

ETL Construction Emissions

In addition to the activities described above, ETL construction will also be carried out. During this activity, the emission source will be the excavation of the foundations of the high-voltage power line pylons. For each pylon, four excavations will be carried out with dimensions of 3x3x3 meters, resulting in a total excavation volume of 108 m^3. The emissions from this activity have been calculated and are presented in the Table 7.5.

Table 7.5: ETL Pylon construction emissions

Activity	Excavation Area (m^3)	Fill Area (m^3)	Total Area (TA) (m^3)	EF (kg/m^3)		Working Period (WP)	Emissions (EF x TA / WP) (kg/h)	
				PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Pylon Excavation	108	-	108	0.004275	0.0004775	8 Hours	0.0577	0.0064

Due to their separate timing from other construction activities and their very low mass flow rates the ETL and pylon excavation activities have been excluded from the modelling study.

Engine Activities

Engine emission factors are derived from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2019-Non-Road mobile sources and machinery. Vehicle emission factors were shown in Table 7.6. Average fuel consumption is compiled from heavy duty machine producers as 25 L/h (20 kg/h = 0.02 t/h).

Table 7.6: Vehicle Emission Factors

Parameter	Emission Factor
	Non-Road (g/kWh-equipment)
NOx	7663 g/tones fuel
CO	7352 g/tonnes fuel
PM_{10}	116 g/tonnes fuel
$PM_{2.5}$	116 g/tonnes fuel
SO_2	14 g/kg fuel*
VOC	930 g/tonnes fuel
Fuel consumption	20.000 g/h

*Calculated by 0.7% Sulphur content
** Because of the lack of explicit data, sample data was used in accordance with the EMEP/EEA 1.a.4 Section 3.2.3

Engine Activities Within the Scope of Construction Phase

Engine emissions include engine emissions from all motor vehicles that can be used for the Project. It is projected that different number of equipment will be used at the Project area. The equipment information to be used in the Project is as presented in Table 7.7.

Table 7.7: Number of Equipment to be Used for Construction Phase

Type of Equipment	Number
Excavator	12
Grader	2
Compactor	4
Water Truck	2
Loader	3
Dozer	1
Back-hoe loader	2
Concrete mixer truck	10
Truck	12
Grand Total (Equipment/Day)	**48**

According to this information, emission calculations are shown in Table 7.8.

Table 7.8: Emission Calculation for Construction Phase

Pollutant	Emission Factor	Fuel consumption (t/h)	Emission Per Vehicle (kg/h)	Total Equipment (Equipment/Day)	Total Emission (kg/h)	Threshold Value (kg/h)
NO_X	7663 g/tonnes fuel	0.02	0.15326	48	7.35648	40
CO	7352 g/tonnes fuel	0.02	0.14704	48	7.05792	500
PM	116 g/tonnes fuel	0.02	0.00232	48	0.11136	10
SO_2	14 g/kg fuel	0.02	0.28	48	13.44	60
VOC	930 g/tonnes fuel	0.02	0.0186	48	0.8928	30

The emissions caused by vehicles in the above table have been calculated, and their comparison with the threshold values in Annex-2 Table 2.1 of the RCAPOI is provided. Since the exhaust emissions are very lower than threshold values, engine emissions are not included in the air quality modelling study.

7.3.4 Determining Magnitude, Sensitivity and Impact Significance

7.3.4.1 Overview

The significance of potential impacts is a function of the presence and sensitivity of receptors, and magnitude of the impact.

While evaluating the contribution of the operational phase effects of the Project to the air quality, the change in the concentrations (process contribution) caused by the Project in sensitive receptors has been taken into account.

Changes in ambient concentrations over 25% of the relevant standards are considered to represent an impact of ‘Major’ magnitude as the WBG General EHS Guidelines note that Projects should: “…prevent or minimize impacts by ensuring that …emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this guideline suggests 25 percent of the applicable air quality standards to allow additional future sustainable development in the same airshed.”

The WBG General EHS Guidelines classify ‘poor quality airsheds’ as those where national standards are exceeded significantly. Therefore, receptors experiencing existing ambient pollutant concentrations above the relevant standards are concluded to be of ‘High’ sensitivity.

Impact magnitude and receptor sensitivity criteria are presented in Table 7.9 and Table 7.10. Where a project creates a new exceedance of an air quality standard, the impact is described as significant irrespective of the receptor sensitivity and impact magnitude.

Table 7.9: Determination of Receptor Sensitivity

Ground Level Pollutant Concentrations in Relation to Standard	Receptor Sensitivity
Above Standard	High
75 to 100% of the Standard	Medium
50 to 75% of the Standard	Low
Below 50% of the Standard	Negligible

Table 7.10: Determination of Impact Magnitude

Change in Concentrations as % of Standard	Impact Magnitude
Increase >25%	Major
Increase 15-25%	Moderate
Increase 5-15%	Minor
Increase <5%	Negligible

The significance has been determined by the interaction between the magnitude of impacts and the sensitivity of receptors affected, as depicted in the significance matrix shown in Table 7.11.

Table 7.11: Impact Significant Matrix

	Sensitivity of Receptors			
Magnitude of Impact	Negligible	Low	Medium	High/Very High
Negligible	Insignificant	Insignificant	Insignificant	Insignificant
Minor	Insignificant	Minor	Minor	Moderate
Moderate	Insignificant	Minor	Moderate	Major
Major	Insignificant	Moderate	Major	Critical

7.4 Air Quality Baseline Conditions and Measurements

7.4.1 Background Measurements

Air quality measurements were conducted by Flora Cevre Laboratuvarı (Flora Environmental Laboratory) for the PMs and gas parameters at the points specified in Section 7.2. Figure 7.2 shows the selected PM monitoring locations. Estimated locations of monitoring locations at macro level were determined by following the pre-modelling study and systematic grid method suggested in the literature (Cruz-Orive and Gual-Arnau, 2002; Falk at al., 2011; Ferrer-Paris at al., 2013; Gallego, 2005; Gardner at al., 2008; Nest and Meyer, 2002)[50]. After macro level determination, a field study was carried out and final points were determined. Monitoring locations have been determined as described in the previous section to represent settlements,

[50] Cruz-Orive, L. M., Gual-Arnau, X. 2002. "Precision of circular systematic sampling", Journal of Microscopy-Oxford, 207 225-242.

Falk, M. G., Denham, R. J., Mengersen, K. L. 2011. "Spatially stratified sampling using auxiliary information for geostatistical mapping", Environmental and Ecological Statistics, 18 (1), 93-108,

Ferrer-Paris, J. R., Rodriguez, J. P., Good, T. C., Sanchez-Mercado, A. Y., Rodriguez-Clark, K. M., Rodriguez, G. A., Solis, A. 2013. "Systematic, large-scale national biodiversity surveys: NeoMaps as a model for tropical regions", Diversity and Distributions, 19 (2), 215-231

Gallego, F. J. 2005. "Stratified sampling of satellite images with a systematic grid of points", Isprs Journal of Photogrammetry and Remote Sensing, 59 (6), 369-376

Gardner, R. H., Lookingbill, T. R., Townsend, P. A., Ferrari, J. 2008. "A new approach for rescaling land cover data", Landscape Ecology, 23 (5), 513-526

Nest, M., Meyer, H. D. 2002. "Improving the mapping mechanism of the mapped Fourier method", Chemical Physics Letters, 352 (5-6), 486-490

agricultural lands, and, if applicable, other sensitive receptors. At each location, monitoring was carried out for 30 days.

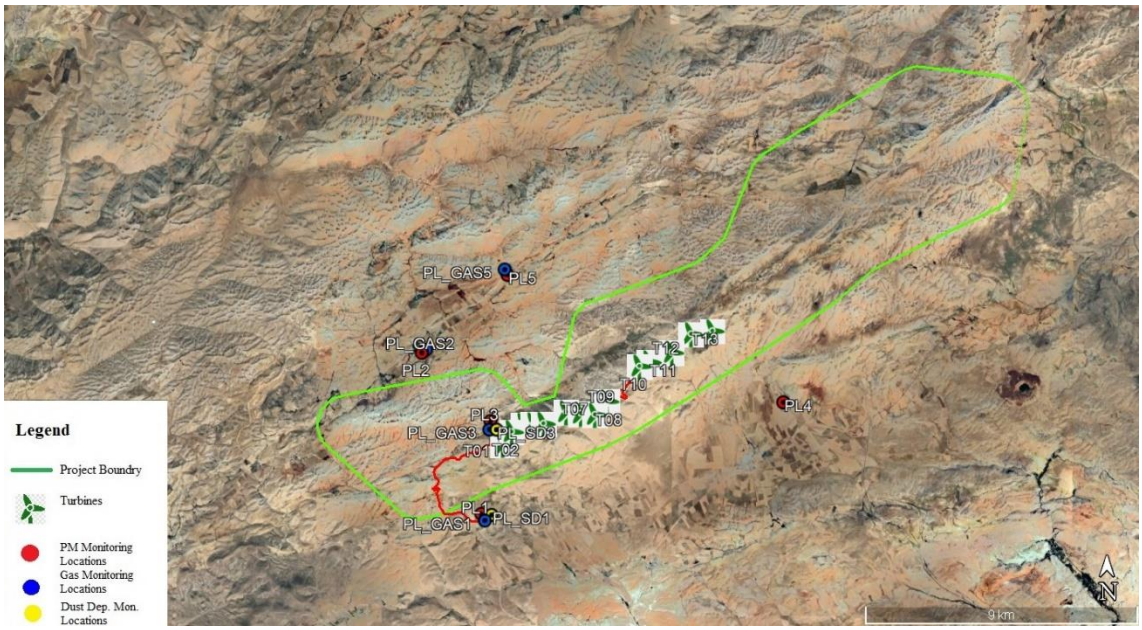


Figure 7.2: Air Quality Monitoring Locations

The measurement locations were selected based on the criteria provided in Section 7.2.4. According to these criteria, the Project study area was evaluated in two groups: settlements and agricultural land. The baseline air quality measurement results are given in Table 7.12 and Table 7.15 for dust emissions and in the

Table 7.13 and Table 7.14 for gas emissions.

Table 7.12: Baseline Air Quality (Dust) Measurement Results

Measurement Location	Description of the Receptor	30 Days Average	
		PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
PL-1	Settlements	55.75	33.04
PL-2	Settlements	27.76	17.74
PL-3	Agricultural Area	9.60	5.16
PL-4	Settlements	11.23	8.65
PL-5	Settlements	18.36	13.41
	Turkish Limit Values (µg/m^3)	40	-
	EU Limit Values (µg/m^3)	40	20
	Project Standard (µg/m^3)	40	20

Table 7.13: Baseline Air Quality (SO_2) Measurement Results

Measurement Location	Description of the Receptor	Monitoring Results		
		1st Term ()	2nd Term	Average
PL-1	Settlements	4.58	2.17	3.38
PL-2	Settlements	5.85	1.53	3.69
PL-3	Agricultural Area	3.83	0.28	2.06
PL-5	Settlements	5.43	2.43	3.93
	Turkish Limit Values (µg/m³)	20 (Yearly)	20 (Yearly)	20 (Yearly)
	EU Limit Values (µg/m³)	-	-	-
Project Standard (µg/m³)		20 (Yearly)	20 (Yearly)	20 (Yearly)

Table 7.14: Baseline Air Quality (NO_2)Measurement Results

Measurement Location	Description of the Receptor	Monitoring Results		
		1st Term()	2nd Term	Average
PL-1	Settlements	1.78	1.01	1.40
PL-2	Settlements	1.57	0.86	1.22
PL-3	Agricultural Area	1.36	0.48	0.92
PL-5	Settlements	2.11	0.55	1.33
	Turkish Limit Values (µg/m³)	40 (Yearly)	40 (Yearly)	40 (Yearly)
	EU Limit Values (µg/m³)	40 (Yearly)	40 (Yearly)	40 (Yearly)
Project Standard (µg/m³)		40 (Yearly)	40 (Yearly)	40 (Yearly)

Table 7.15: Baseline Air Quality (Dust Deposition) Measurement Results

Measurement Location	Description of the Receptor	STV	LTV
PL-1	Settlements	16.14	11.21
PL-3	Agricultural Area	12.38	8.96
	Turkish Limit Values (µg/m³)	310	290
	EU Limit Values (µg/m³)	-	-
Project Standard (µg/m³)		310	290

*STV stands for Short Term Value and LTV stands for Long Term Value

According to Table 7.12, it is seen that at measurement locations PL-1, PL-2, PL-3, PL-4 and PL-5, PM_{10} results exceed long term Project standards while $PM_{2.5}$ results exceeded the long-term Project standards at all measurement locations. Main reason of the exceedance is the seasonal changes on air quality sources. PM_{10} and $PM_{2.5}$ monitoring study was conducted in winter season and fossil fuel burn for residential heating activities contribute to air pollution. SO_2 and NO_2 parameters comply with project standards.

7.5 Impact Assessment

7.5.1 Impact Assessment of PM's

Construction activities associated with the proposed project is associated with the site preparation and building activities. These activities are expected to result in temporary dust and gas emissions.

Construction activities include two main parts. The first one is earthworks and site preparation of the Project area. In this part, dust emissions generated from excavation, load and unloading process and engine emissions from construction equipment and vehicles. The second one involves turbine construction. In this part, construction equipment's movement such as trucks, backhoes etc. will cause particulate matter emissions from land and engine emissions.

Air Pollution Contribution Values (APCV) determined from the modelling studies for PM_{10} and $PM_{2,5}$ are listed in Table 7.16.

Table 7.16: Modelling Results of PM's

Parameter	Averaging Period	Maximum APCV and Coordinates (X, Y)	Project Standards
PM_{10} (µg/m^3)	Daily	590,82 (333058,4301437)	45 µg/m^3
	Exceedance	10	35
	Annual	8,71 (333058,4301437)	15 µg/m^3
$PM_{2,5}$ (µg/m^3)	Daily	27,16 (338378,4303879)	-
	Annual	0,45 (338378,4303879)	20 µg/m^3

As seen in Table 7.16. PM_{10} and $PM_{2.5}$ parameters comply with Project standards. The cumulative assessment of air quality contribution values resulting from the construction phase of the Project, along with background measurements, is summarized in Table 7.17. Monthly measurement results were taken as long-term background concentration. Maximum daily and annual average emissions for PM_{10} and $PM_{2.5}$ are shown in Figure 7.3 to Figure 7.6. These monitoring locations are broadly representative of nearby receptors likely to experience the greatest impacts from the construction activities associated with the Project.

Table 7.17: Cumulative Evaluation of PM's

Measurement Location	Background Concentration		Air Emission due to Project Activities				Cumulative Value at the Measurement Points			
			PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)		PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)	
	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)	Daily	Annual	Daily	Annual	Daily	Annual	Daily	Annual
PL-1	55.75	33.04	0.16	0.01	0.03	<0.01	55.91	55.76	33.07	33.04
PL-2	27.76	17.74	0.07	<0.01	0.01	<0.01	27.83	22.76	17.75	17.74
PL-3	9.60	5.16	7.08	0.05	0.17	0.01	16.68	9.65	5.33	5.17
PL-4	11.23	8.65	0.17	<0.01	0.03	<0.01	11.4	11.23	8.68	8.65
PL-5	18.36	13.41	0.06	<0.01	0.06	<0.01	18.42	18.36	13.47	13.41
Turkish Limit Values (µg/m^3)			50	40	-	-	50	40	-	-
EU Limit Values (µg/m^3)			50	40	-	20	50	40	-	20
Project Standard (µg/m^3)			**50**	**40**	**-**	**20**	**50**	**40**	**-**	**20**

According to the cumulative emission calculation based on the modelling study and measurement results, the PM_{10} and $PM_{2.5}$ emissions resulting from the Project exceed daily and yearly project standards at PL-1 Location. As it was explained before, main reason of the exceedance is high baseline concentrations due to high emission contribution from the residential heating in winter season. The overall significance of the predicted impacts from the construction phase is presented through Table **7.24** to Table **7.31**

7.5.2 Impact Assessment of NO_2

Construction activities associated with the proposed expansion is associated with the site preparation and turbine construction activities. These activities are expected to result in temporary dust and gas emissions. Construction activities include two main parts. The first one is earthworks and site preparation of the Project area. In this part, dust emissions generated from excavation, load and unloading process and engine emissions from construction equipment and vehicles. The second one involves turbine construction. In this part, construction equipment's movement such as trucks, backhoes etc. will cause particulate matter emissions from land and engine emissions.

APCV determined from the modelling studies for NO_2, are listed. Table 7.18 These results are the maximum predicted across the study area.

Table 7.18: Modelling Results of NO_2

Parameter	Averaging Period	Maximum APCV and Coordinates (X, Y)	Project Standards
NO_2(µg/m^3)	Hourly	432,39 (332686,4301177)	200 µg/m^3
	Exceedance	13	18
	Annual	7,12 (333447,4301419)	15 µg/m^3

As seen in Table 7.18 NO_2 comply with Project standards. The cumulative assessment of air quality contribution values resulting from the construction phase of the Project, along with background measurements, is summarized in Table **7.19**. Monthly measurement results were taken as long-term background concentration. Maximum hourly and annual average emissions for NO_2 are shown in Figure 7.7 and Figure 7.8 These monitoring locations are broadly representative of nearby receptors likely to experience the greatest impacts from the construction activities associated with the Project.

Table 7.19: Cumulative Evaluation of NO_2

Monitoring Location	Background Concentration	Air Emission due to Project Activities		Cumulative Value at the Monitoring Locations	
	NO_2(µg/m³)				
	Average	Hourly	Annual	Hourly	Annual
PL-1	1.40	16.10	0.03	17.5	1.43
PL-2	1.22	7.41	0.01	8.63	1.23
PL-3	0.92	85.23	0.15	86.15	1.07
PL-5	1.33	9.14	0.01	10.47	1.34
Turkish Limit Values (µg/m³)		200	15	200	15
EU Limit Values (µg/m³)		200	15	200	15
Project Standard (µg/m³)		200	15	200	15

According to the cumulative emission calculation based on the modelling study and measurement results, the emissions resulting from the Project comply with the Project standards. The overall significance of the predicted impacts from the construction phase is presented through Table **7.24** and Table **7.31**.

7.5.3 Impact Assessment of SO_2

Construction activities associated with the proposed expansion is associated with the site preparation and turbine construction activities. These activities are expected to result in temporary dust and gas emissions. Construction activities include two main parts. The first one is earthworks and site preparation of the Project area. In this part, dust emissions generated from excavation, load and unloading process and engine emissions from construction equipment and vehicles. The second one involves turbine construction. In this part, construction equipment's movement such as trucks, backhoes etc. will cause particulate matter emissions from land and engine emissions.

APCV determined from the modelling studies for SO_2, are listed in Table 7.20. These results are the maximum predicted across the study area.

Table 7.20: Modelling Results of SO_2

Parameter	Averaging Period	Maximum APCV and Coordinates (X, Y)	Project Standards
SO_2(µg/m³)	Hourly	788,97 (332686,4301177)	350 µg/m³
	Exceedance	17	24
	Daily	79.46 (332686,4301177)	125 µg/m³
	Annual	12,98 (333447,4301419)	20 µg/m³

As seen in Table 7.20 SO_2 comply with Project standards. The cumulative assessment of air quality contribution values resulting from the construction phase of the Project, along with background measurements, is summarized in Table 7.21. Monthly measurement results were taken as long-term background concentration. Maximum hourly and annual average emissions for NO_2 are shown in Figure 7.9 to Figure 7.11 These monitoring locations are broadly representative of nearby receptors likely to experience the greatest impacts from the construction activities associated with the Project.

Table 7.21: Cumulative Evaluation of SO_2

Monitoring Location	Background Concentration	Air Emission due to Project Activities			Cumulative Value at the Monitoring Locations		
	SO_2(µg/m³)						
	Average	Hourly	Daily	Annual	Hourly	Daily	Annual
PL-1	3.38	29.37	1.35	0.06	32.75	4.73	3.44
PL-2	3.69	13.53	0.59	0.02	17.22	4.28	3.71
PL-3	2.06	119.79	10.61	0.27	121.85	12.67	2.33
PL-5	3.93	16.68	0.76	0.02	20.61	4.69	3.95
Turkish Limit Values (µg/m³)		350	125	15	350	125	15
EU Limit Values (µg/m³)		350	125	15	350	125	15
Project Standard (µg/m³)		350	125	15	350	125	15

7.5.4 Dust Deposition

Table 7.22: Modelling Results for Dust Deposition

Parameter	veraging Period	Maximum APCV and Coordinates (X, Y)	Project Standards
Dust Deposition (mg/m².day)	TV	102.12 (330058,4301437)	290 µg/m³
	TV	11.98 (336999,4302726)	310 µg/m³

Table 7.23: Cumulative Evaluation of Dust Deposition

Monitoring Location	Background Concentration	Air Emission due to Project Activities		Cumulative Value at the Monitoring Locations	
	Dust Deposition((mg/m².day))				
	Average	STV	LTV	STV	LTV
PL-1	11.21	0.58	0.01	11.79	11.22
PL-3	8.96	4.15	0.07	13.11	9.03
Turkish Limit Values		200	15	200	15
EU Limit Values		200	15	200	15
Project Standard		**310**	**290**	**310**	**290**

Table 7.24: Impact Significance of Daily PM_{10}

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	PL-1	50	55.75	Above Standard	High	57.17	Increase <5%	Negligible	Insignificant
	PL-2	50	27.76	50 to 75% of the Standard	Low	28.2	Increase <5%	Negligible	Insignificant
	PL-3	50	9.60	Below 50% of the Standard	Negligible	12.71	Increase <5%	Negligible	Insignificant
	PL-4	50	11.23	Below 50% of the Standard	Negligible	11.87	Increase <5%	Negligible	Insignificant
	PL-5	50	18.36	Below 50% of the Standard	Negligible	18.76	Increase <5%	Negligible	Insignificant

Table 7.25: Impact Significance of Yearly PM_{10}

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	PL-1	15	55.75	Above Standard	High	56.11	Increase <5%	Negligible	Insignificant
	PL-2	15	27.76	Above Standard	High	27.8	Increase <5%	Negligible	Insignificant
	PL-3	15	9.60	50 to 75% of the Standard	Low	10	Increase <5%	Negligible	Insignificant
	PL-4	15	11.23	75 to 100% of the Standard	Medium	11.39	Increase <5%	Negligible	Insignificant
	PL-5	15	18.36	Above Standard	High	18.39	Increase <5%	Negligible	Insignificant

Table 7.26: Impact Significance of Yearly $PM_{2.5}$

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score for	
Construction Activities	PL-1	20	33,04	Above Standard	High	33,04	Increase <5%	Negligible	Insignificant
	PL-2	20	17,74	75 to 100% of the Standard	Medium	17,74	Increase <5%	Negligible	Insignificant
	PL-3	20	5,16	Below 50% of the Standard	Negligible	5,16	Increase <5%	Negligible	Insignificant
	PL-4	20	8,65	Below 50% of the Standard	Negligible	8,65	Increase <5%	Negligible	Insignificant
	PL-5	20	13,41	75 to 100% of the Standard	Medium	13,41	Increase <5%	Negligible	Insignificant

Table 7.27: Impact Significance of Hourly NO_2

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score for	
Construction Activities	PL-1	200	1.40	Below 50% of the Standard	Negligible	17.5	Increase >25%	Major	Insignificant
	PL-2	200	1.22	Below 50% of the Standard	Negligible	8.63	Increase >25%	Major	Insignificant
	PL-3	200	0.92	Below 50% of the Standard	Negligible	86.15	Increase >25%	Major	Insignificant
	PL-5	200	1.33	Below 50% of the Standard	Negligible	10.47	Increase >25%	Major	Insignificant

Table 7.28: Impact Significance of Yearly NO_2

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	**PL-1**	**40**	1.40	Below 50% of the Standard	Negligible	1.43	Increase <5%	Negligible	Insignificant
	PL-2	**40**	1.22	Below 50% of the Standard	Negligible	1.23	Increase <5%	Negligible	Insignificant
	PL-3	**40**	0.92	Below 50% of the Standard	Negligible	1.07	Increase <5%	Negligible	Insignificant
	PL-5	**40**	1.33	Below 50% of the Standard	Negligible	1.34	Increase <5%	Negligible	Insignificant

Table 7.29: Impact Significance of Hourly SO_2

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	**PL-1**	350	3.38	Below 50% of the Standard	Negligible	32.75	Increase >25%	Major	Insignificant
	PL-2	350	3.69	Below 50% of the Standard	Negligible	17.22	Increase >25%	Major	Insignificant
	PL-3	350	2.06	Below 50% of the Standard	Negligible	121.85	Increase >25%	Major	Insignificant
	PL-5	350	3.93	Below 50% of the Standard	Negligible	20.61	Increase >25%	Major	Insignificant

Table 7.30: Impact Significance of Daily SO_2

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	PL-1	125	3.38	Below 50% of the Standard	Negligible	4.73	Increase <5%	Negligible	Insignificant
	PL-2	125	3.69	Below 50% of the Standard	Negligible	4.28	Increase <5%	Negligible	Insignificant
	PL-3	125	2.06	Below 50% of the Standard	Negligible	12.67	Increase <5%	Negligible	Insignificant
	PL-5	125	3.93	Below 50% of the Standard	Negligible	4.69	Increase <5%	Negligible	Insignificant

Table 7.31: Impact Significance of Annual SO_2

Activity	Receptor	Project Standard	Receptor Sensitivity			Impact Magnitude			Impact Significance
			Baseline Air Quality (µg/m³)	Relation to Standard	Sensitivity Score	Cumulative Emission Values (µg/m³)	Change in Conc. as % of Standard	Magnitude Score	
Construction Activities	PL-1	15	3.38	Below 50% of the Standard	Negligible	3.44	Increase <5%	Negligible	Insignificant
	PL-2	15	3.69	Below 50% of the Standard	Negligible	3.71	Increase <5%	Negligible	Insignificant
	PL-3	15	2.06	Below 50% of the Standard	Negligible	2.33	Increase <5%	Negligible	Insignificant
	PL-5	15	3.93	Below 50% of the Standard	Negligible	3.95	Increase <5%	Negligible	Insignificant

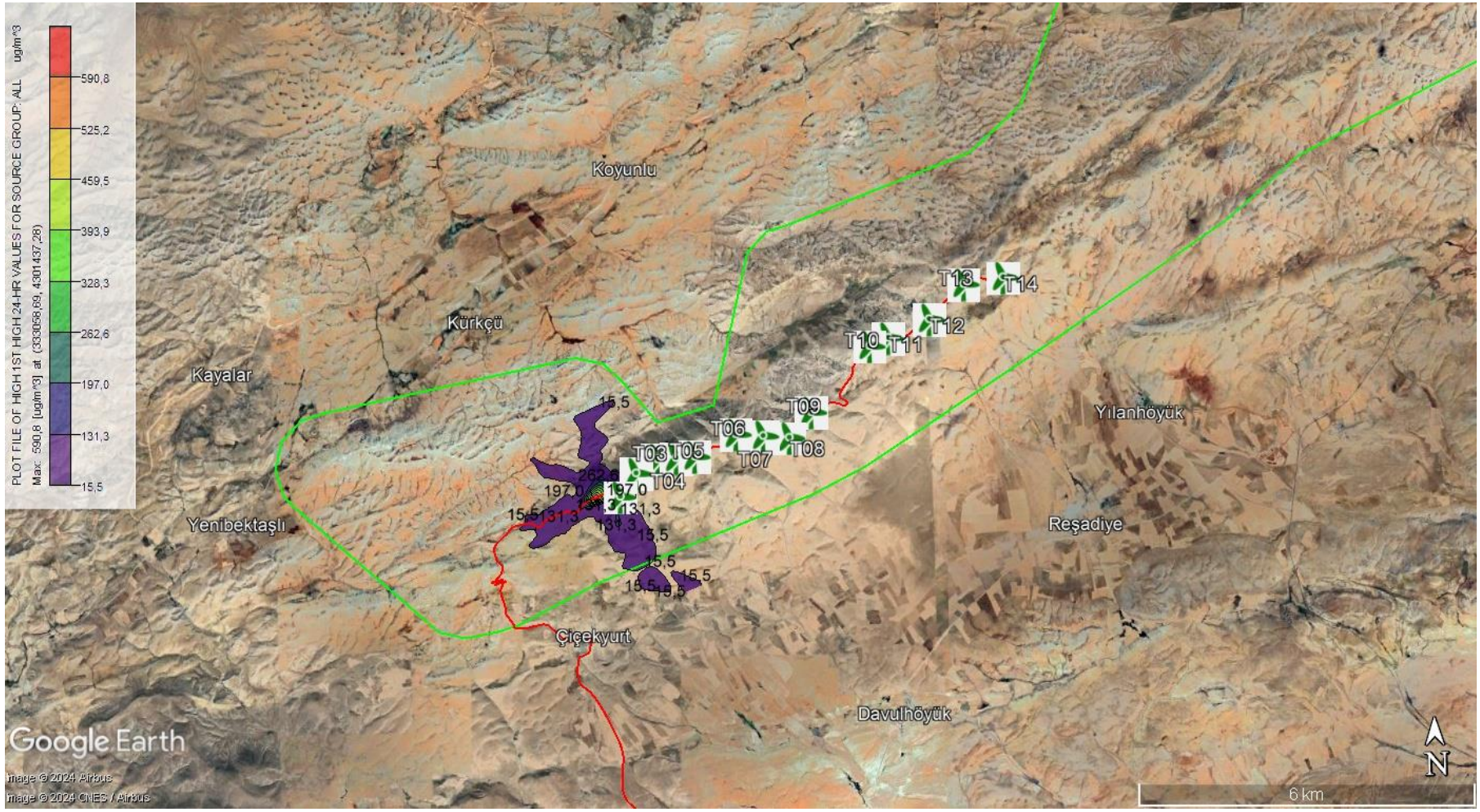


Figure 7.3: Maximum Daily Average PM_{10} Emissions for Construction Phase

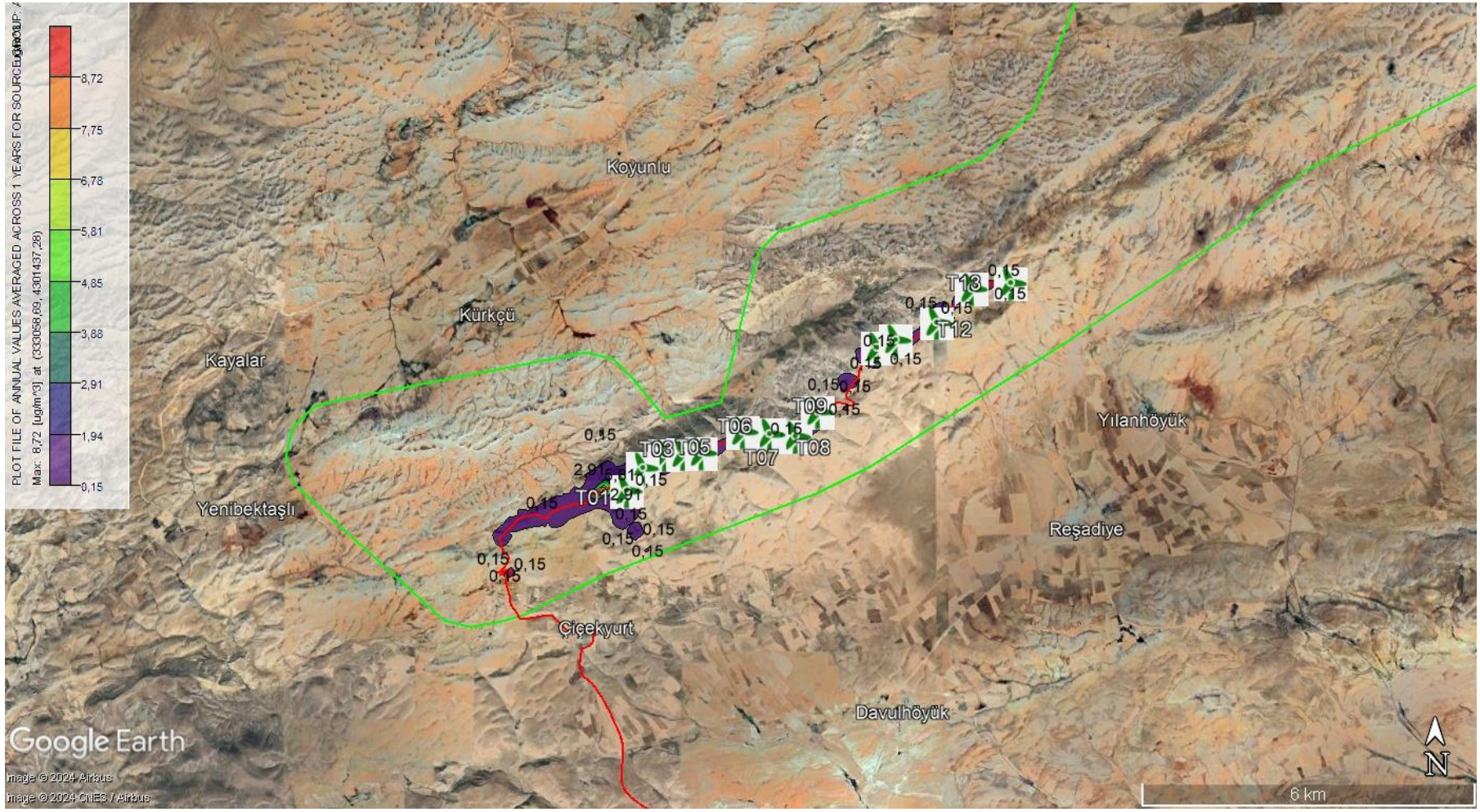


Figure 7.4: Maximum Annual Average PM_{10} Emissions for Construction Phase

Figure 7.5: Maximum Daily Average $PM_{2.5}$ Emissions for Construction Phase

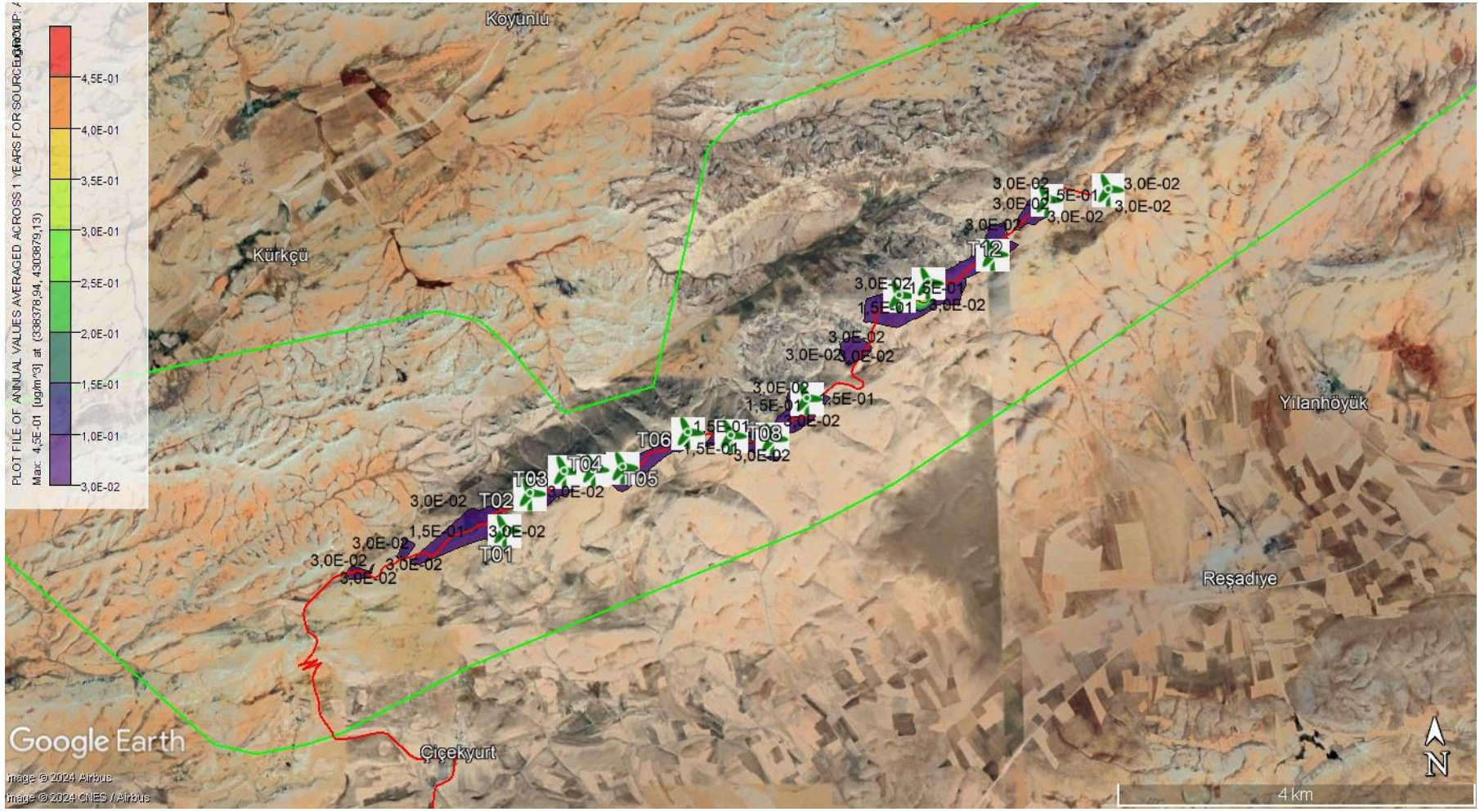


Figure 7.6: Maximum Annual Average $PM_{2.5}$ Emissions for Construction Phase

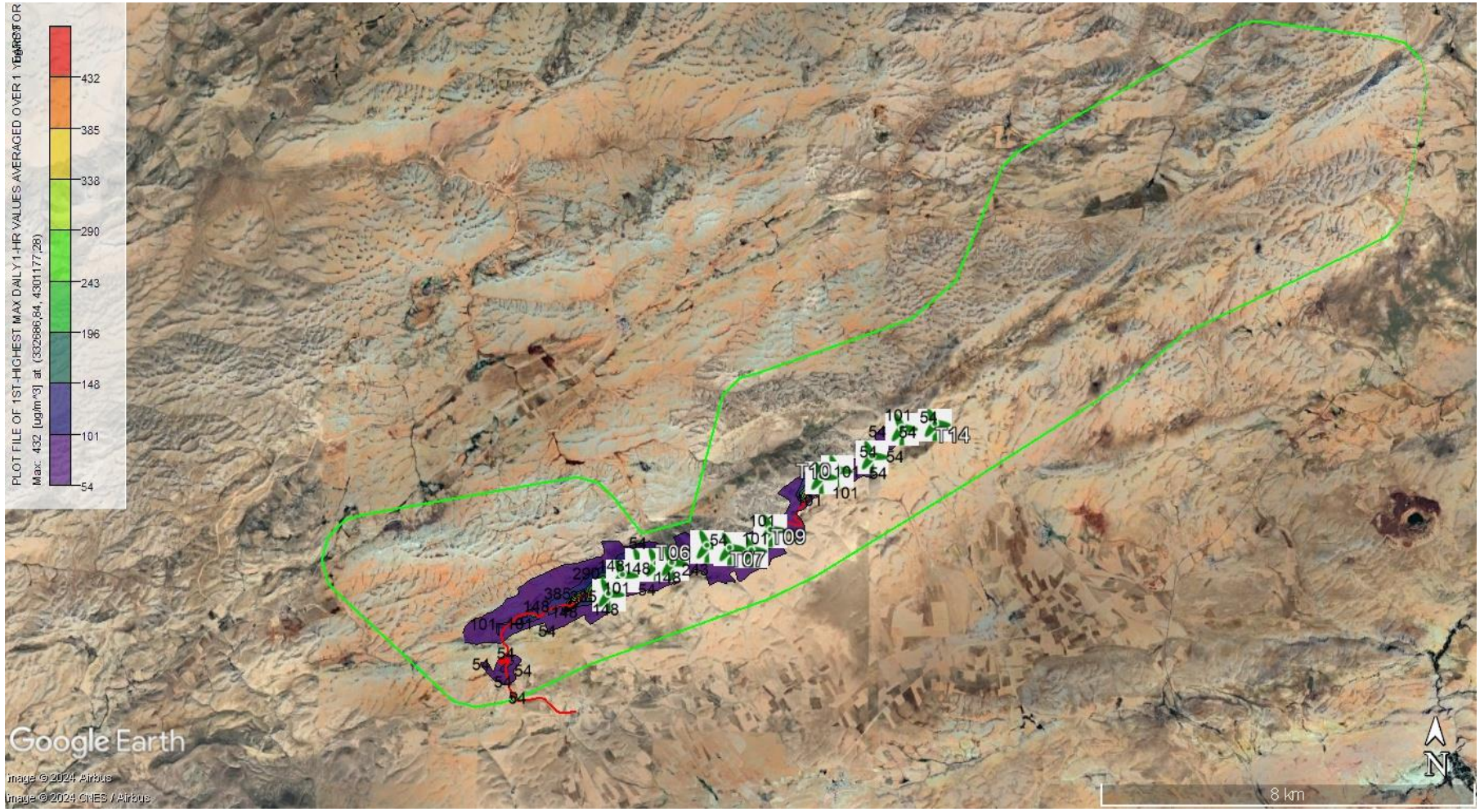


Figure 7.7: Maximum Hourly Average NO_2 Emissions for Construction Phase

Figure 7.8: Maximum Annual Average NO_2 Emissions for Construction Phase

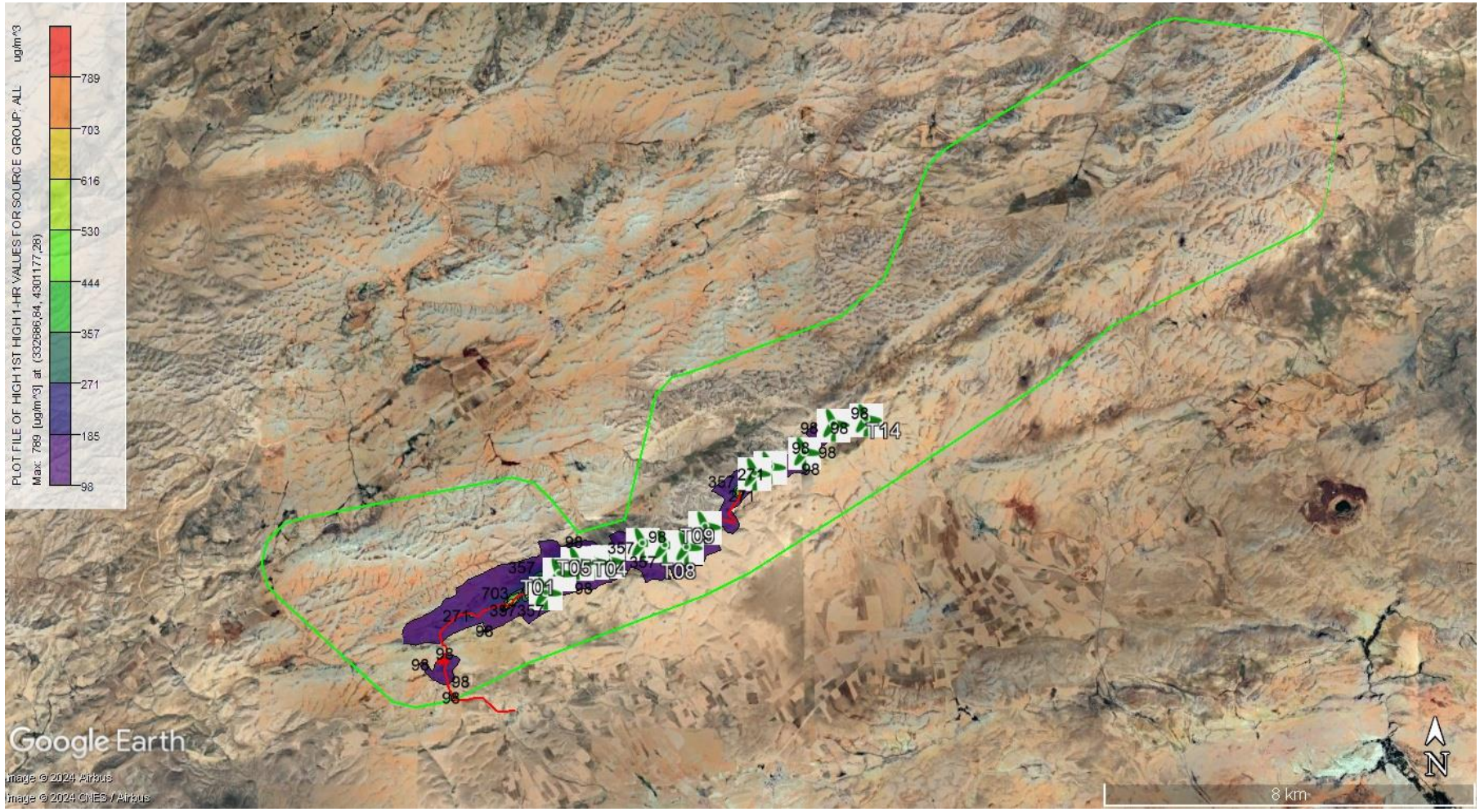


Figure 7.9: Maximum Hourly Average SO_2 Emissions for Construction Phase

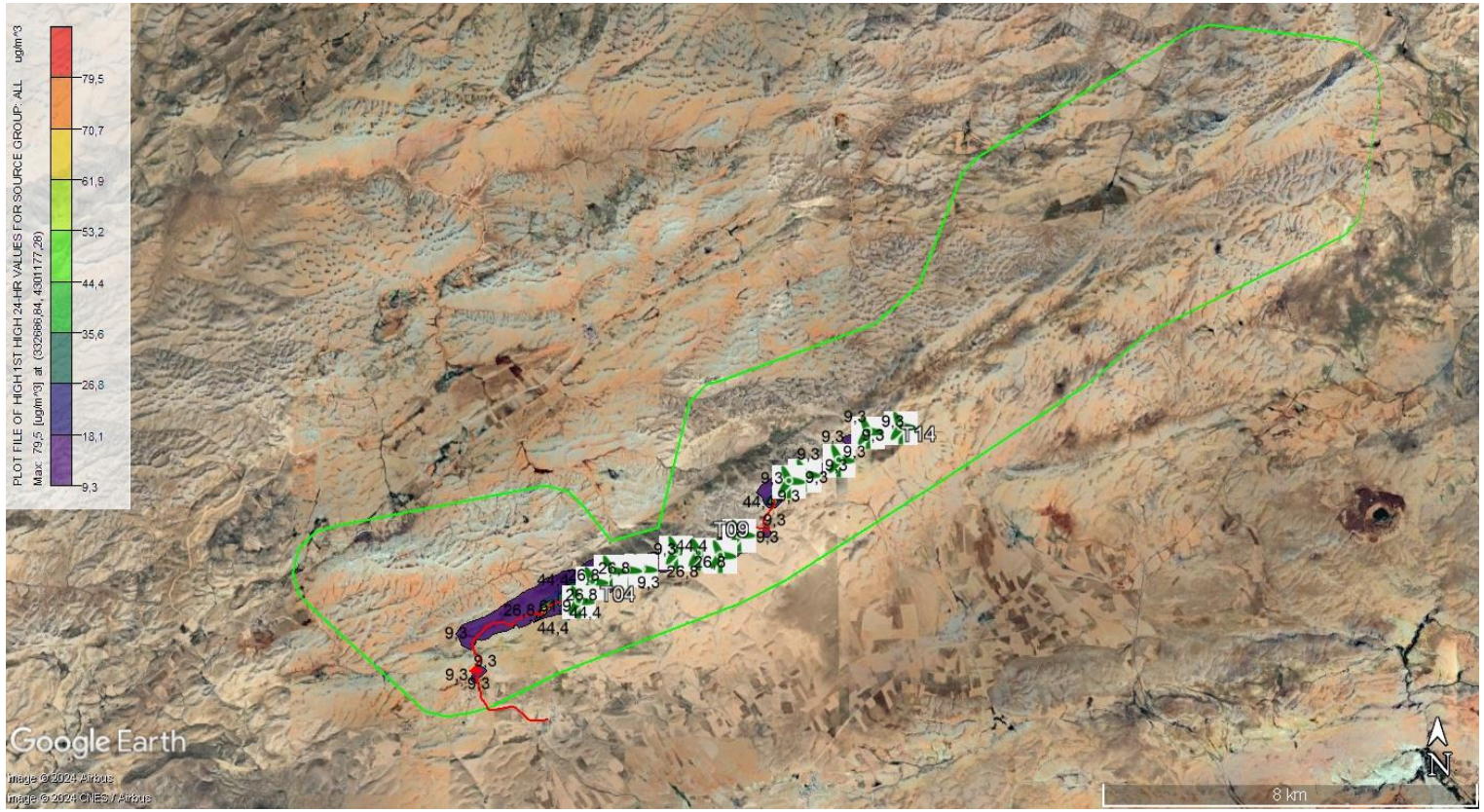


Figure 7.10: Maximum Daily Average SO_2 Emissions for Construction Phase

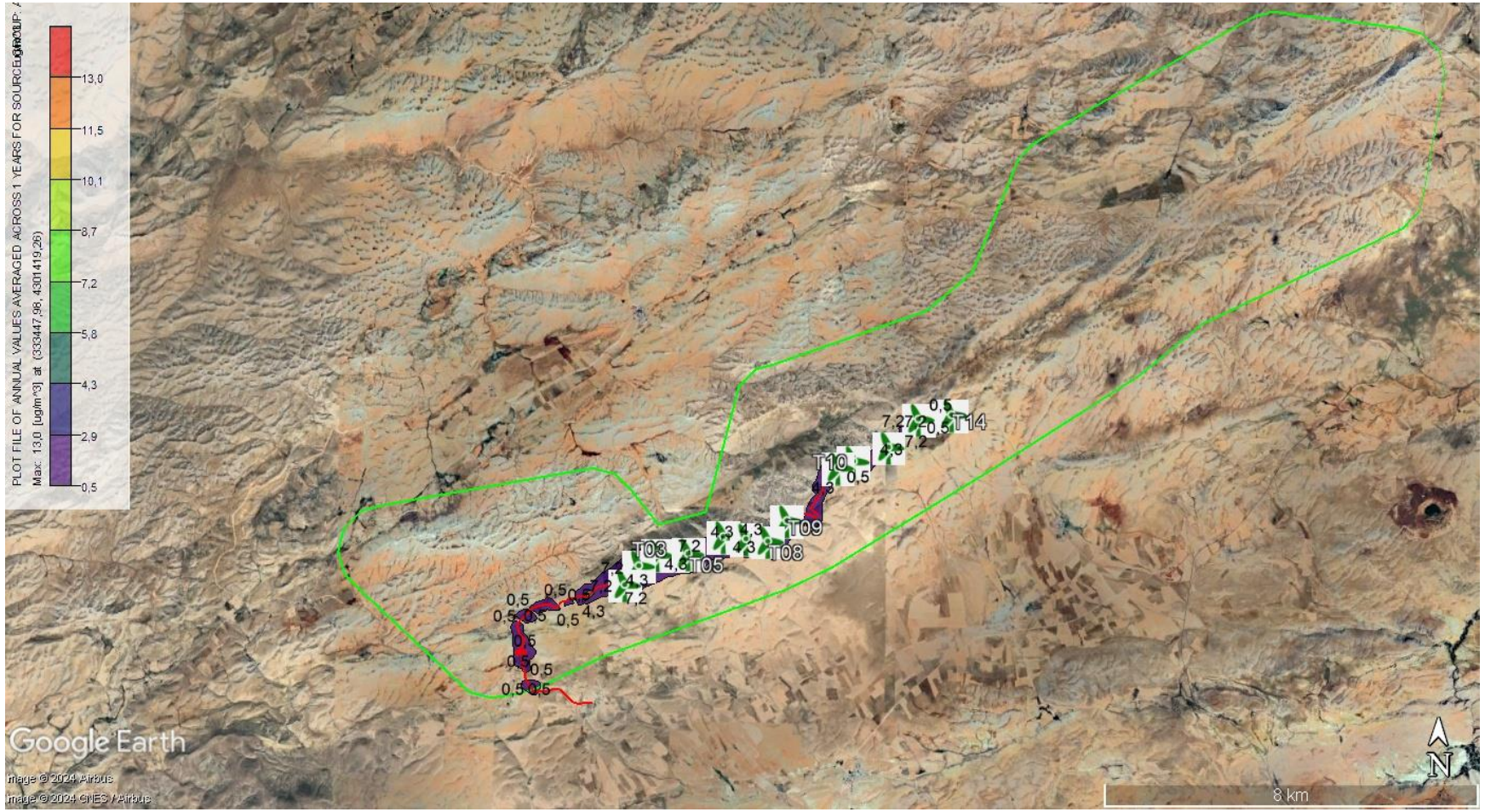


Figure 7.11: Maximum Annual Average SO_2 Emissions for Construction Phase

7.5.5 Impact Mitigation & Residual Impact

The WBG General EHS Guidelines document was used for air emission abatement techniques concerning to the construction phase.

During the construction phase of the Project, dust emission will occur due to excavation activities and movements of construction machinery. Secondly, exhaust emissions from the engines of the vehicles will occur.

Mitigation measures will include:

- All the provisions provided in Air Quality Management Plan will be complied with.
- Community grievances regarding air quality including air emissions and dust generation will be collected through Community Grievance Mechanism established as part of Stakeholder Engagement Plan (SEP) and will be addressed by the Project Company.
- Any unnecessary soil moving/clearing will be avoided to minimize dust.
- All vehicles that generate dust due to transportation or construction works will move within a speed limit of 30 km/h and speed limit signs will be posted on Project area. All vehicles that are loaded with sand, soil, gravel or any other material will be covered to prevent the load from spilling and forming dust. In addition, 20km/h speed limit will be applied on unpaved surfaces close to settlements.
- All vehicles will undergo regular maintenance according to the manufacturer's recommended intervals and individual maintenance schedules will be created for each vehicle.
- Operators will be trained to take appropriate action in case of abnormal events (e.g., black smoke emission).
- Vehicles will be turned off when idling is necessary, provided that the ambient temperature is above 0°C. For ambient temperatures below 0°C, vehicles will be turned off if the idling time exceeds 5 minutes. Exceptions to this rule may apply in emergency situations, for occupational health and safety reasons, or due to traffic conditions. Operators will be informed about these exceptions during their training.
- Drivers will be instructed about the importance of adhering to speed limits and smooth acceleration to minimize fuel consumption and emissions.
- All piling of materials/soils will be stabilized in a manner that minimizes the occurrence of dust by wetting the top layer.
- All excavation activities will be organized according to wind direction.
- Travel route will be dampened using a bowser and dust screens utilized if necessary.
- To reduce fugitive dust emission during vehicle operation on public roads and at construction sites, service roads and material storage sites, dust suppression methods (i.e. watering with water trucks, speed limits for mobile vehicles, using well-maintained vehicles/equipment) will be used.
- Dust generating activities will cease during excessively windy periods. Excessive wind periods and dust generation will be subjectively assessed by field personnel.
- Any loose material that could produce dust when travelling will be covered and/or maintained appropriate freeboard (+0.3m) on trucks or vessels hauling.
- Stockpiles will be inspected regularly.
- Excessive vehicular movement will be avoided.
- If necessary, haul roads and areas of hard standing of excessive dust will be cleaned.
- Covers and/or control equipment can be used to minimize dust from material handling.

- Vehicles will be kept clean, so that no dirt is carried on the vehicles into and out of the area. Wheel washing will be done for all construction vehicles prior to exiting the construction site.
- Stockpiling of stripped surface material, e.g. rock, sand and soil, stockpiling of unwashed materials, will be limited.
- Design of stockpiles will be optimized to maintain a low profile without a sharp change in shapes.
- Good practice will be applied for selection of Project vehicles that meet the latest emission standards (e.g. EURO 5 or US EPA Tier 2 emission standards) and maintained in a reasonable working order.
- Emissions from road and off-road vehicles must comply with national or regional programs.
- Nationally, exhaust emissions are subject to the conditions set forth in the Exhaust Gas Emission Control Regulation, which was published in the Official Gazette No. 30004 on March 11, 2017. Accordingly, exhaust emissions must be measured at specific intervals that vary depending on the vehicle type. Vehicles to be used within the scope of the project will be subjected to exhaust inspection at the intervals specified in the vehicle categories indicated on their registration certificates. Necessary arrangements will be made for non-compliant vehicles to be sent to technical service.

A 24-hour monitoring study for PM_{10} and $PM_{2.5}$ parameters will be conducted at baseline measurement points quarterly to determine the impact of the works on air quality and the effectiveness of emission control measures.

8 Climate & Greenhouse Gases (GHG)

8.1 Introduction

Climate Change

This chapter reports upon the climate change risk assessment (CCRA) conducted in line with the Equator Principles IV (Principle 2 and Annex A)[51] for assessing physical climate risks. The climate change risk assessment considers climate-related risks upon physical project receptors (as identified within Section 8.2), as well as nearby social and environmental receptors as outlined within other chapters of this ESIA.

Construction phase impacts of climate change on the Project are within the scope of this Assessment considering the fact that impacts of climate change have already been observed. Impacts of climate change on the operational phase of the Project are also within the scope of this Assessment and are considered to be permanent changes that may affect the Project throughout its operational lifetime of 49 years.

Greenhouse Gas Emissions

This chapter also considers potential carbon effects from operation of the Project, in accordance with IFC, Equator Principles IV, and EBRD guidelines.

Consideration of GHG emissions impacts during the construction phase is scoped in for this Assessment to review compliance with IFC PSs[52], which require a GHG emissions assessment to determine whether combined Scope 1 and Scope 2 emissions are expected to be more than 25,000 tonnes of CO_2 equivalent per year. Although there is no anticipated significant GHG emissions arising from the operation of the Project considering its nature (i.e., a renewable energy investment), potential carbon sources during the operation phase of the Project are provided in this Assessment for effective management of GHG emissions. Also, avoided GHG emissions associated with the Project during the operational phase are within the scope of this Assessment.

It is noted that the EBRD guidance[53] requires construction-related emissions to be included in the Assessment where they are likely to be greater than 5% of the emissions or savings associated with the operation of the Project. The compliance with the EBRD guidance is evaluated in line with the results of the assessment of GHG emissions during the construction phase and provided in relevant section of this chapter.

[51] Equator Principles IV (2020), Guidance Note on Climate Change Risk Assessment. Last accessed in November 2023 here: Guidance CCRA_May 2023 (equator-principles.com)

[52] International Finance Corporation. Performance Standards on Environmental and Social Sustainability. Last accessed in March 2024 here: https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-3-en.pdf.

[53] EBRD (2017) Protocol for Assessment of Greenhouse Gas Emissions. Last Accessed in November 2023 here: https://www.ebrd.com/documents/admin/ebrd-protocol-for-assessment-of-greenhouse-gas-emissions.pdf

8.2 Methodology

8.2.1 Applicable Guidelines and Standards

International standards and guidelines applicable to the Project for the assessment of physical climate change risks to the Project and carbon impacts of the Project during construction and operation phases have been presented in this section as follows.

Equator Principles IV (EP IV)[54]

The EP IV are a voluntary set of standards for determining, assessing, and managing social and environmental risks in project financing, including those related to climate change and GHG emissions. They were established to provide a minimum standard for due diligence to support responsible risk decision-making. The principles apply globally and to various sectors, ensuring that the projects financed are developed in a manner that is socially responsible and reflects sound environmental management practices. As such, the EP IV provides guidance on CCRA and GHG emissions.

International Finance Corporation (IFC): Performance Standards (PSs) on environmental and social sustainability[55]

The IFC PSs are part of the IFC's Sustainability Framework aimed for the IFC's clients. The PSs provide guidance on how to identify, manage, and mitigate the risks and impacts of projects, including those related to changing climate and carbon emissions. As part of PSs, Guidance Notes are provided with specific requirements for enhancing project sustainability.

As part of the guidance, a number of requirements are given to clients when certain thresholds are passed. Regarding GHG emissions, IFC PS3: Resource Efficiency and Pollution Prevention outlines client responsibilities for managing and reducing GHG emissions.

BSI: Publicly Available Specification 2080: 2023 (PAS 2080)[56]

PAS 2080 is a globally recognised framework for managing whole life carbon emissions in infrastructure and buildings. PAS 2080 contains requirements across the value chain to establish effective systems for reducing whole life carbon elicited through a rigorous carbon management process.

Initially published in 2016, the updated 2023 specification introduced changes to help guide and integrate low-carbon decision-making into all aspects of an assets' life cycle. Changes include:

- The scope of the standard now includes buildings in addition to infrastructure.
- A greater emphasis on whole life carbon.
- Alignment with net zero.
- A new clause on procurement.
- Encouraging a holistic view of carbon management through systems thinking, by considering the interconnected relationship between assets, networks, and systems and how all influence or have control of carbon.
- Highlighting the importance of collaboration and promoting early engagement across the value chain to integrate decision-making throughout an assets' lifecycle.

[54] Equator Principles. EP4. Last accessed in March 2024 here: The Equator Principles_EP4_July2020 (equator-principles.com).

[55] International Finance Corporation. Performance Standards on Environmental and Social Sustainability. Last accessed in March 2024 here: 2012-ifc-performance-standards-en.pdf.

[56] British Standards Institution (BSI). Publicly available specification 2080:2023. Last accessed in March 2024 here: PAS 2080:2023 Carbon Management in Infrastructure | BSI (bsigroup.com).

- Links with nature and climate resilience.

Quantifying emissions in the built environment requires a whole life carbon approach across the lifecycle stages of an infrastructure project. Within PAS 2080: 2016, the lifecycle stages of infrastructure projects are broken down into 3 stages to enable GHG emissions quantification.

- Before use stage: A0-5
- Use stage: B1-9
- End-of-life stage: C1-4

RICS: Whole life carbon assessment for the built environment[57]

RICS whole life carbon assessment (WLCA) standard serves as a technical methodology for assessing carbon emissions in the built environment. It provides guidance for tracking carbon emissions across the entire life cycle of buildings and infrastructure projects. This includes emissions from material production, construction processes, usage, and eventual disposal. The WLCA standard provides a holistic view, considering three critical components: embodied carbon, operational carbon, and user carbon.

World Resources Institute: The greenhouse gas (GHG) protocol[58]

The GHG protocol establishes a standardised framework to measure and manage GHG emissions across various contexts. The protocol includes guidance on setting organisational and operational boundaries, managing inventory quality, and reporting GHG emissions. The protocol differentiates emissions by scope:

- Scope 1 Direct emissions from owned or controlled sources (e.g., fuel combustion).
- Scope 2: Indirect emissions from purchased electricity, heat, or steam.
- Scope 3: Indirect emissions from the entire value chain (e.g., supply chain, product use, waste).

8.2.2 Climate Change

The CCRA is conducted using the following methodology. Please note that the same methodology is used to assess physical climate change risks to the Project during construction and operation phases.

- The study area for the CCRA is defined as the Project area itself and the physical, social, and environmental receptors. For example, the physical receptors are those mechanical and electrical equipment and components contained within the Project. Social receptors include staff and local communities (as identified by *Chapter 13: Social Environment*). The environmental receptors are those nearby environments that could be affected by the combined impacts of changing climate and other impacts caused by the Project.
- The climate baseline shall be constructed using the World Bank Climate Change Knowledge Portal (CCKP) (containing the climate projection data that underpins the IPCC WG1 AR6 report). A precautionary approach will be used to understand the future climate for the mid-future (2040-2059) and the far future (2060-2079) based on the following climate change scenarios:
    - SSP1-2.6 for the mid-future (2040-2059) and the far future (2060-2079)
    - SSP2-4.5 for the mid-future (2040-2059) and the far future (2060-2079)

[57] Royal Institute of Chartered Surveyors. Whole life carbon assessment for the built environment. Last accessed in March 2024 here: Whole life carbon assessment (WLCA) for the built environment (rics.org).

[58] World Business Council for Sustainable Development and World Resources Institute. The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard. Last accessed in March 2024 here: ghg-protocol-revised.pdf (ghgprotocol.org).

  - SSP5-8.5 for the mid-future (2040-2059) and the far future (2060-2079)
- Each climate hazard (e.g., increased average and maximum temperatures) shall be analysed using expert knowledge and desk-based review to identify risks to the Project receptors (e.g., increased speed of thermal fatigue and deterioration of metallic or plastic components and joints of moving parts due to extremely high temperatures).
- For each risk identified, the effect of climate change for climate change scenarios for the mid-future and the far-future will be assessed, based on a lifespan of 49 years, meaning that the WPP will still be in operation to 2079.
- Embedded mitigation that forms part of the design and provides climate resilience will be identified.
- A risk rating for each impact will be determined. The scoring of severity of impact on the Project infrastructure will take into account embedded design aspects, which may provide mitigations for climate risks, based on design information made available. The overall risk rating will then be calculated as the combination of likelihood of occurrence of climate change variable and severity of impact on the Project infrastructure as outlined in Section 8.4. Significant effects are those risks that are calculated as being either high or extreme.
- Additional mitigation measures will be identified where they exist.
- Residual risks to the Project (after the application of additional mitigation measures) will be calculated using the same method.

8.2.2.1 Receptors / Area of Influence (AoI)

The AoI with regard to climate resilience is defined as physical receptors that make up the Project, as well as nearby environmental and social receptors that may be subject to in-combination climate impacts due to the Project. The receptors that have been identified as being in the scope for the climate change risk assessment include:

- Turbines,
- Administration Building,
- Access Roads and Site Roads,
- Staff.

Please note that receptors related to construction activities have been also identified within the scope of this Assessment (Please see Table 8.17 for corresponding ones).

8.2.2.2 Impact Assessment

The following qualitative calculation method is used to determine the level of risk associated with present and future climate change impacts to the Project to understand its risk:

$$Impact = likelihood\ of\ impact\ (occurence) \times severity/consequence\ of\ impact$$

Likelihood

The likelihood of impacts to the infrastructure is rated based on the scale in Table 8.1. This has been determined based on an evaluation of current and projected (future) climate data, using a representation of the likelihood of impacts. The current climate impact is based on an estimated impact return period, using the information collected.

Table 8.1: Likelihood of occurrence of the changing climate variable

Rating	Likelihood of recurring events
Rare	Unlikely during next 50 years, or has not occurred in the past five years
Unlikely	May arise once in 25 years, or may have occurred in the last five years

Rating	Likelihood of recurring events
Possible	May arise once in 10 years, or has happened during the past five years but not every year
Likely	May arise about once per year, or has happened at least once in the past year and in each of the previous five years
Almost certain	Could occur several times per year, or is certain to occur

Source: Produced by Mott MacDonald

Severity

The potential severity of the climate impact is rated based on the scale in Table 8.2. This has been determined based on a combination of expert judgement and review of available evidence and literature.

Table 8.2: Potential severity of impact on the Project infrastructure

Rating	Likelihood of recurring events
Insignificant	No infrastructure damage, little change to service.
Minor	Localised infrastructure service disruption. No permanent damage. Some minor restoration work required. Early renewal of infrastructure by 10-20%. Need for new / modified equipment.
Moderate	Limited infrastructure damage and loss of service. Damage recoverable by maintenance and minor repair. Early renewal of infrastructure by 20-50%.
Major	Extensive infrastructure damage requiring major repair. Major loss of infrastructure service. Early renewal of infrastructure by 50-90%. Injury to workforce.
Critical	Significant permanent damage and/or complete loss of the infrastructure and the infrastructure service. Loss of infrastructure support and translocation of service to other sites. Early renewal of infrastructure by >90%. Serious injury to workforce.

Source: Produced by Mott MacDonald

Evaluation and Determination of Significance of Impact

The risk to the assets of the Project is scored using the risk matrix in Table 8.3 below, which categorises the level of risk as low, medium, high, or extreme as defined in Table 8.4.

Table 8.3: Risk scoring matrix

		Severity of Impact				
		Insignificant	Minor	Moderate	Major	Critical
Likelihood	Rare	Negligible	Low	Low	Medium	High
	Unlikely	Negligible	Low	Medium	Medium	High
	Possible	Low	Low	Medium	High	High
	Likely	Low	Medium	Medium	High	Extreme
	Almost certain	Low	Medium	High	Extreme	Extreme

Source: Produced by Mott MacDonald

Table 8.4: Risk category

Rating	Acceptance level	Consequence on the Project
Low	Acceptable	A low level of vulnerability to specific climate risk(s). Remedial action or adaptation may be required.
Medium	Tolerable	A moderate level of vulnerability to specific climate risk(s). Mitigation action or adaptation could improve resilience, although an appropriate level of resilience is provided.
High	Intolerable / Tolerable	A high level of vulnerability to specific climate risk(s). Mitigation action or adaptation is recommended.

Rating	Acceptance level	Consequence on the Project
Extreme	Intolerable	An extreme level of vulnerability to specific climate risk(s). Mitigation action or adaptation is highly recommended.

Source: Produced by Mott MacDonald

8.2.2.3 Assumptions and Limitations

The assessment in this report is based on freely available information from third parties for reporting purposes that is relevant to the Project location. This includes observational data from local weather stations, readily available climate change projections, climate change datasets and literature at the time of writing this assessment. The following limitations and disclaimer should be noted:

- Climate change projections: climate projections are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical greenhouse gas emissions scenarios and assumptions. The results from the experiments performed by climate models cannot, therefore, be treated as exact or factual, but projection options. They represent representations of how the climate may evolve in response to a range of potential forcing scenarios. For a single emission scenario, projections can vary significantly as a function of the model used and how it is applied, so that there is a wide uncertainty band in the results.

  Scenarios exclude outlying “surprise” or “disaster” scenarios in the literature and any scenario necessarily includes subjective elements and is open to various interpretations. Generally global projections are more certain than regional, and temperature projections are more certain than those for precipitation and wind. Further, the degree of uncertainty associated with all climate change projections increases for projections further into the future. Climate models and associated projections are updated on a regular basis, implying changes in the forecasted future climate. The data is obtained to provide a general ‘sense check’ on the published literature on existing observational and climate projections for the region.
- Use of this report: This report is relevant to the Project information provided and is not intended to address changes in Project configuration or modifications that might occur over time.
- Mott MacDonald has not independently verified the observational or projection data and does not accept responsibility or liability for any inaccuracies or shortcomings in this information.

  We have not undertaken any climate modelling and rely solely on freely available data on climate projections in this region.
- Should these information sources be modified by these third parties we assume no responsibility for any of the resulting inaccuracies in any of our reports. Any further research, analysis or decision-making should take account of the nature of the data sources and climate projections and should consider the range of literature, additional observational data, evidence and research available, and any developments in these.

8.2.3 Greenhouse Gas (GHG) Emissions

The data used to calculate GHG emissions resulting from Project activities during construction and operation phases has been provided by the Project Company. Where required data has not been provided, assumptions were made to quantify emissions. Those assumptions have been provided within related parts in this Assessment.

8.2.3.1 Construction phase

The information received from the Project Company within the scope of assessment of construction related GHG emissions contains the following:

- Technical information of the wind turbines including:
  - hub height (m)
  - rotor diameter (m)
  - swept area (m^2)
  - total blade length (m)
  - tip height (m)
  - power ratings (kW)
  - volume of the onshore platform and foundation (m^3)
  - the number of turbines
- Information on the material used for the following wind turbine components: the tower, the rotor blade, and the nacelle casing.
- Cables and overhead line construction length (km).
- The total area of road construction (m^2) resulting from new road construction and road improvements as well as the material used to construct the roads.
- The total land area taken of the Project (m^2) and the area (m^2) of each land type within the Project: forestry, agricultural, and non-agricultural land.
- Electricity consumption during the construction phase (MWh).
- Fuel use during the construction phase for both onsite equipment and the transportation of workers to site (litres).
- On-site waste production during the construction phase of the Project (tons)

Emission factors

To calculate carbon emissions related to the Project's construction phase requires emission factors for all materials and assets used during the construction phase. Attempts have been made to use the most geographically specific emissions factors, but where these are unavailable due to data limitations, UK based, globally accepted emissions factors have been used. As such, the emissions factors used for this carbon assessment come from the following databases:

- Moata Carbon Portal (Mott MacDonald's in-house carbon calculator),
- ICE v3.0[59],
- Department for Energy Security and Net Zero[60],
- Emissions factors developed from project experience,
- The International Energy Agency[61],
- JBA consulting[62],

[59] Circular ecology. Embodied Carbon – The ICE Database. Last accessed in March 2024 here: Embodied Carbon Footprint Database - Circular Ecology.

[60] Department for Energy Security and Net Zero. Greenhouse gas reporting: conversion factors 2023. Last accessed in March 2024 here: Greenhouse gas reporting: conversion factors 2023 - GOV.UK (www.gov.uk).

[61] The International Energy Agency. Emissions factors 2022. Last accessed in March 2024 here: Emissions Factors 2022 - Data product - IEA

[62] JBA Consulting. Exploring the economics of land use change for increasing resilience to climate change in England. Table C-4. Last accessed in March 2024 here: theccc.org.uk/wp-content/uploads/2018/12/JBA-

- Forest Research[63].

Material quantities

The specific quantities of materials for the wind turbine components were not provided for this Assessment. To determine the quantity of materials used for the construction of the Project from the data provided, required several assumptions in relation to the wind turbine materials. The National Renewable Energy Laboratory's Wind Turbine Design Cost and Scaling Model[64] was used to determine material quantities for specific wind turbine components within the rotor and nacelle and was used to determine the weight of the wind turbine towers. Further, assumptions have been made relating to material types, overhead line specifications, roads, and fuel use. The full list of assumptions made is provided below under "Assumptions and Limitations" in this section.

Carbon calculation methodology

Having determined quantities, material types, and emissions factors for the construction phase, the following equation has been used to calculate the expected GHG emissions from the Project:

$$Emissions\ (tCO2e) = rate\ of\ activity\ (unit) \times emission\ factor\ (tCO2e/unit)$$

Here, related terms in the above equation refers to the following:

- The rate of activity in the above equation refers to detailed information on the Project (e.g., the mass of materials used).
- The emission factor in the above equation refers to the quantity of emissions produced per unit of activity data obtained from the internationally recognized sources.

Assessment scope

As the scope of this Assessment considers construction-related GHG emissions, the before-use-stage emissions A1-A5 are calculated. These stages are highlighted in Figure 8.1.

The land-use change emissions result from forestry clearance and the loss of sequestration potential due to the land-use change. However, there are no emissions resulting from land-use change as no forest area is taken within the scope of the Project. Therefore, these emissions are not reported in this Assessment.

Consulting-Exploring-the-economics-of-land-use-change-for-increasing-resilience-to-climate-change-in-England.pdf.

[63] Forest Research. The storage of carbon in trees and timber. Last accessed in March 2024 here: The storage of carbon in trees and timber (forestresearch.gov.uk).

[64] The National Renewable Energy Laboratory's Wind Turbine Design Cost and Scaling Model. Last accessed in March 2024 here: Wind Turbine Design Cost and Scaling Model (nrel.gov)

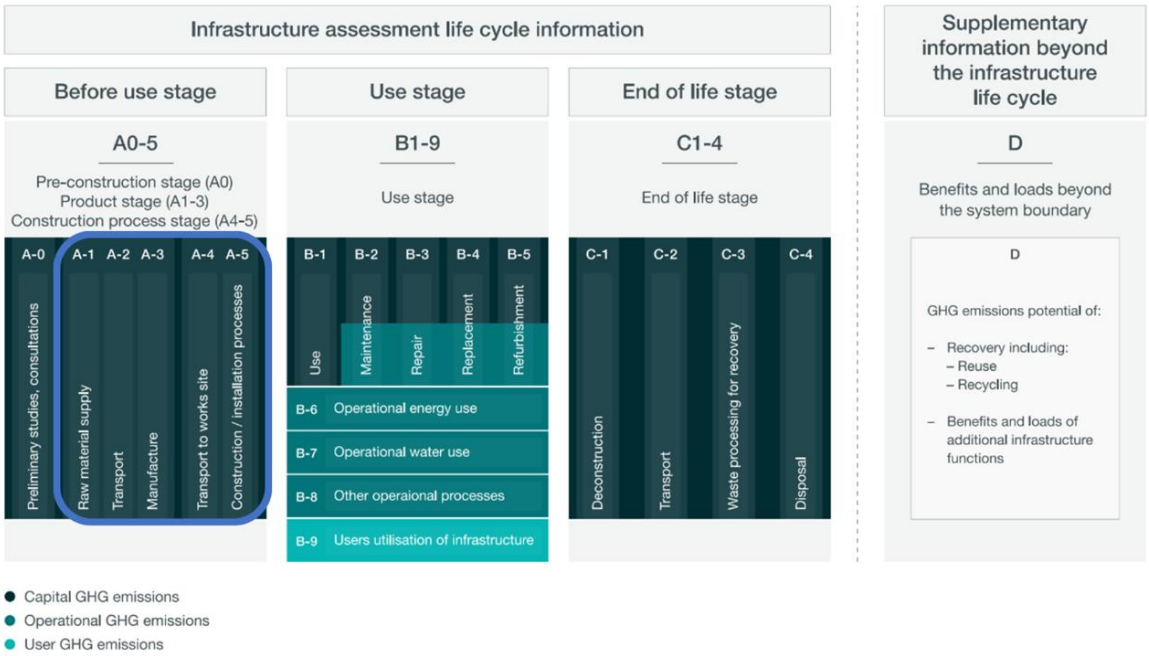


Figure 8.1: PAS 2080: 2016 Lifecycle stages for infrastructure[65]

On a whole life carbon basis, the following construction-related activities are within the scope of this Assessment.

- A1 – A3 (Product stage):
  - A1: Raw material supply
  - A2: Raw material transport
  - A3: Manufacture
- A4 (Transport):
  - A4: Transportation of materials from factory gate to and from project site
- A5 (Construction process stage)
  - A5.2: On-site activities
  - A5.3: On-site waste
  - A5.4: Worker transport

On an emissions scope basis, the following activities are within the scope of the Assessment:

- Scope 2:
  - On site activities (purchased electricity)
- Scope 3:
  - Raw material supply
  - Raw material transport
  - Manufacture
  - Transportation of materials
  - On-site activities (fuel consumption)
  - On-site waste
  - Worker transportation

[65] British Standards Institution (BSI). Publicly available specification 2080:2023. Last accessed in March 2024 here: PAS 2080:2023 Carbon Management in Infrastructure | BSI (bsigroup.com)

The scope of the Assessment on a whole life carbon basis and a scope basis is summarised in Table 8.5.

Table 8.5: Assessment scope

Project section	Whole-life carbon lifecycle stage	Scope	Comments
Wind turbine components	A1-A3	Scope 3	Purchased goods
Road materials	A1-A3	Scope 3	Purchased goods
Transmission cables	A1-A3	Scope 3	Purchased goods
Material transport from factory to site	A4	Scope 3	Transport & distribution
Power consumption in construction	A5	Scope 2	Purchased electricity
Fuel consumption in construction	A5	Scope 3	Subcontractor activity
On-site waste in construction	A5	Scope 3	Subcontractor activity
Worker transport to site	A5	Scope 3	Employee and or subcontractor commuting

Due to an absence of information splitting worker transport, power consumption, and fuel use activities between the Project Company and sub-contractors, this Assessment has assumed the Project Company has sub-contracted out all construction and transportation activities. Therefore, the majority of emissions across the Project are assumed to be Scope 3 as summarised in Table 8.5.

Assumptions and Limitations

High level assumptions made specifically for the assessment of construction-related GHG emissions are outlined in Table 8.6. The full details and values of each assumption are provided in the calculation spreadsheet.

Table 8.6: Assumptions made

Category	Asset / Component	Assumption	Further comments
Material transport to site	Transport distance	Scaled RICS transport distances for the UK to Turkey where appropriate – for national transport distances.	This assumption was made due to a lack of data on the transport distances of materials to site
	Sourcing of materials	The location and origin of materials – either locally manufactured, regionally manufactured, or European manufactured, was made based on professional judgement and experience.	This assumption was made due to a lack of information on the origin of project materials.
	Fiberglass	The fiberglass used for the wind turbines was sourced from Europe.	This assumption was made due to a lack of information.
Worker transport to site	Diesel used per worker for transportation to site	Emissions arising from worker transport to the site are out of scope of the assessment as no information on the use of regular vehicles and shuttle buses was provided by the Project Company.	-
Road construction	Road width	A road width of 4m.	Provided by the Project Company
	Road depth	9.19 inches assumed as it is in the 75th percentile of gravel road depths given the road will be used to transport heavy materials	Assumption was made as data was only provided on area of road constructed, not the volume of material used to construct the road.

Category	Asset / Component	Assumption	Further comments
	Gravel density	The mid-point of gravel density averages was chosen.	This assumption was made to calculate the volume of gravel used in road construction
Substation	Electrical substation	The substation is outside the scope of this assessment.	The substation was installed by a separate company, the Turkish Electricity Transmission Corporation (TEİAŞ), and no information was provided on its construction.
Fuel	On site fuel consumption and worker transport	Assumed that 100% mineral diesel is used to power on site machinery and equipment as well as to power worker transportation vehicles.	Based on professional judgement and industry practice.
Wind turbines	Foundations	The provided volume of concrete for the Project is assumed to be the total volume of concrete used and not concrete used per turbine.	Based on professional judgement.
	Foundations and platform	No information on the volume of foundations and platform was provided by the Project Company. The amount required to calculate construction-related GHG emissions has been estimated based on the Project Company's other ongoing WPP construction in Sivas, Turkey.	This assumption was made to estimate the total volume of foundations and platform.
	Foundations and platform	Only concrete is assumed to be used for the foundations and platform.	Based on professional judgement and an absence of data on materials used.
	Foundation concrete	RC 28 / 35 concrete is assumed to be used.	Based on ICE v3.0 concrete descriptions and professional judgement.
	Turbine components	Gearbox, generator, and the cooling system are all excluded from the assessment as emissions are expected to be a de minimis portion of total emissions.	Based on professional judgement.
	Turbine components	The assumed components are: Hub Pitch bearing Pitch bearing system Low speed shaft Bearing housing Mechanical brakes Yaw drive and bearing Mainframe Nacelle cover Nose cone	The components within the turbines are assumed based on literature and industry common practice. These assumptions were made as data was not provided on the specific components within each turbine.
	Turbine components	Material assumptions are made for: Hub (Iron) Pitch bearing (engineering steel) Bearing system (steel, finished cold-rolled coil) Low speed shaft (engineering steel) Bearing housing (Steel pickled hot-rolled coil) Mechanical brake (Steel, finished cold-rolled coil) Yaw drive and bearing (Engineering steel)	The materials for components are assumed based on literature and industry common practice. Specific materials e.g., engineering steel is assumed based on ICE v3.0 material descriptions

Category	Asset / Component	Assumption	Further comments
		Mainframe (Engineering steel) Nacelle cover (Composite fiberglass) Nose cone (Composite fiberglass)	
	Turbine components mass	The mass for the assumed components was derived from an NREL technical report which provides equations using technical information to quantify the mass of the assumed components. The equations used are contained in the calculation spreadsheet.	-

8.2.3.2 Operation phase

The information received from the Project Company within the scope of assessment of operational GHG emissions contains the following:

- Fuel consumption during the operation phase for on-site generators and maintenance and refurbishment activities (litres),
- Electricity consumption during the operation phase (e.g., for lightning and security purposes purposes) (MWh).

Emission factors

Emission factors obtained from recognized sources are employed to assess operational GHG emissions, including the following:

- GHG Protocol Calculation Tools and Guidance[66],
- Turkish national electricity grid emissions factors[67],
- Turkish electricity generation and electricity consumption point emissions factors information form[68]

Carbon calculation methodology

GHG emissions during the operation phase are calculated using the bottom-up approach outlined in Section 8.2.3.1, based on publicly available emissions factor data for operating activities. For example, the use of on-site generators is in L/yr x emissions factor for the fuel consumption.

Assessment scope

Although there is no anticipated significant GHG emissions arising from the operation of the Project considering the nature of the Project (i.e., a renewable energy investment), potential Scope 1 and Scope 2 emission sources during the operation phase of the Project are identified and assessed for effective management of GHG emissions in this Assessment. Also, avoided

[66] Emissions factors obtained from the GHG Protocol Calculation Tools and Guidance. Last accessed in February 2024 here: https://ghgprotocol.org/calculation-tools-and-guidance.

[67] Turkish national electricity grid emission factors published by the Ministry of Energy and Natural Resources Last accessed in November 2023 here: https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf.

[68] Turkish electricity generation and electricity consumption point emissions factors information form. Last accessed in February 2024 here: https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/EmisyonFaktorleri/TEUVETN_Emisyon_Fakt%C3%B6rleri_Bilgi_Formu.pdf.

GHG emissions associated with the Project during the operation phase are within the scope of this Assessment.

Assumptions and Limitations

The avoided GHG emissions presented within this Assessment are based on the assumption associated with energy production, and therefore inherently obtain a large degree of uncertainty.

8.3 Baseline Conditions

8.3.1 Climate Change

As part of this Section, the resilience of the Project to climate change is being assessed. The Project is located in Sivas. Based on the Project location, climatic conditions in Sivas is considered to be best representing the Project area.

The climate baseline is presented in two stages. The first is the present-day climate, which shows the current climatic conditions in Sivas. The second is the future baseline, which describes projected climate change (presented as a departure from baseline).

Based on an expected operational lifetime of 49 years, the projected climate conditions for a mid- future (2040-2059) and far-future (2060-2079) are presented. Using a precautionary principle and in line with Equator Principles IV (EP4), SSP1-2.6 (Shared Socioeconomic Pathway 1), SSP2-4.5 (Shared Socioeconomic Pathway 2), and SSP5-8.5 (Shared Socioeconomic Pathway 5) scenarios are used to present projected climate change for the mid-future and the far-future.

This data is drawn from the World Bank Climate Change Knowledge Portal (CCKP), using data from the IPCC's sixth Assessment Report (AR6) published in 2021[69]. This data is recent, using the latest climate science, and is also available at the subnational level (specific to Sivas); however, it has not been dynamically downscaled to improve accuracy and to correct bias for local climate systems. The worst case (or highest emissions) scenario available from this dataset is referred to as SSP5-8.5.

A summary of the data source is presented in Table 8.7 as follows:

Table 8.7: Data sources employed to establish the future climate baseline

Data source	Mid- future time horizon	Far future time horizon	Reference period	Future scenario used
World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP1-2.6
World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP2-4.5
World Bank CCKP	2040-2059	2060-2079	1995-2014	SSP5-8.5

8.3.1.1 Present-day climate

According to the data obtained from the Turkish State Meteorological Service[70] for the period 1930 – 2022, the hottest months of the year are July and August, and the coldest months of the

[69] Climate Change 2021: The Physical Science Basis. Working Group I Contribution to the IPCC Sixth Assessment Report, Last accessed in November 2023 here: https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/.

[70] Obtained from Meteoroloji Genel Müdürlüğü (mgm.gov.tr). Last accessed in January 2024.

year are January and February (Figure 8.2). The mean, maximum summertime, and mean wintertime temperatures for this period are 8.99 °C, 28.60 °C in August, and -7.30 °C in January, respectively. The maximum and minimum temperatures measured in this period are 40.00 °C in July and -34.40 °C in February, respectively.

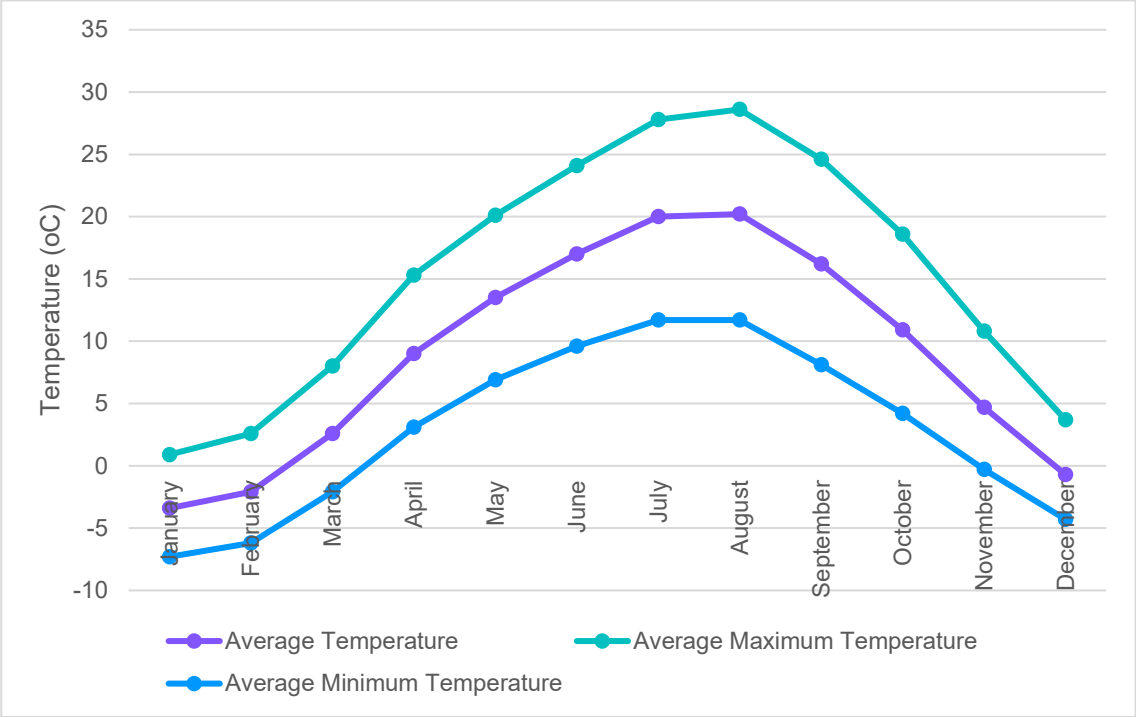


Figure 8.2: Temperature data for the period 1930-2022[71]

The highest recorded average precipitation is 60.4 mm in May for the period 1930 – 2022, whereas the lowest recorded one is 6.8 mm in August (Figure 8.3). For this period, the annual mean of total precipitation is 430.90 mm. According to the data provided by the Turkish State Meteorological Service, the highest recorded daily precipitation in Sivas was 55.0 mm in May.

[71] Obtained from Meteoroloji Genel Müdürlüğü (mgm.gov.tr). Last accessed in January 2024.

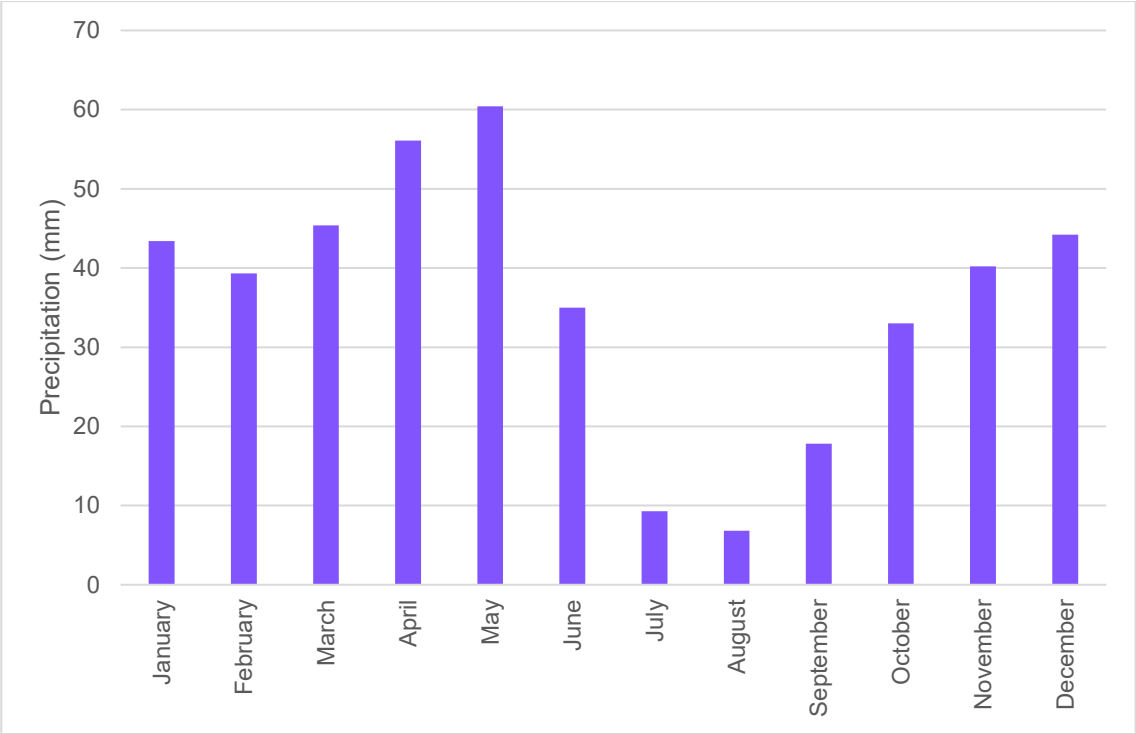


Figure 8.3: Precipitation data for the period 1930 – 2022[72]

The present-day (1930-2022) climate conditions in Sivas is summarised in Table 8.8 as follows:

Table 8.8: Present-day (1930 – 2022) climate

Climate variable	Value
Annual mean temperature	8.99 ºC
Max. summertime temperature (August)	28.6 ºC
Min. wintertime temperature (January)	7.3 ºC
Average annual precipitation	35.91 mm per month
Average summertime precipitation (June / July / August)	17.03 mm per month
Average springtime precipitation (March / April / May)	53.97 mm per month

8.3.1.2 Future climate baseline

The mid-future and far-future possible climate for Sivas according to the IPCC SSP1-2.6, SSP2-4.5, and SSP5-8.5 climate change scenarios are presented in Table 8.9. These are projected values calculated for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios as a departure from the modelled climate for a reference period (1995-2014) and are specific for Sivas province.

Table 8.9: Future climate baseline, SSP1-2.6, SSP2-4.5, & SSP5-8.5, reference period 1995-2014 (50th percentile)[73]

Climate variable	Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
Annual mean temperature	SSP1-2.6	8.16 ºC	9.72 ºC	9.89 ºC
	SSP2-4.5		9.91 ºC	10.45 ºC

[72] Obtained from Meteoroloji Genel Müdürlüğü (mgm.gov.tr). Last accessed in January 2024.

[73] Received from https://climateknowledgeportal.worldbank.org/. Last accessed in January 2024.

Climate variable	Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
	SSP5-8.5		10.62 °C	11.95 °C
Max. temperature (August)	SSP1-2.6	27.36 °C	29.80 °C	29.98 °C
	SSP2-4.5		30.07 °C	31.04 °C
	SSP5-8.5		31.32°C	33.21 °C
Min. temperature (January)	SSP1-2.6	-8.30 °C	-6.80 °C	-6.80 °C
	SSP2-4.5		-7.10 °C	-6.50°C
	SSP5-8.5		-6.60 °C	-5.40 °C
Mean precipitation (August)	SSP1-2.6	10.09 mm	8.35 mm	8.74 mm
	SSP2-4.5		7.82 mm	6.56 mm
	SSP5-8.5		7.41 mm	6.12 mm
Mean precipitation (May)	SSP1-2.6	89.70 mm	89.71 mm	88.98 mm
	SSP2-4.5		89.58 mm	87.37 mm
	SSP5-8.5		84.99 mm	81.34 mm

The present-day climate is established using the climate data covering the period 1930 – 2022, whereas the future climate baseline is constructed based on the baseline period (1995 – 2014) available in the World Bank CCKP. Since the timeframes used for the present-day climate and future climate baseline are different, there is a difference in the value of climate variables in Table 8.8 and Table 8.9.

The projected absolute monthly maximum and minimum temperatures and precipitation seen in Table 8.9 are also shown schematically below. Projected absolute monthly maximum and minimum temperatures for climate change scenarios for the mid-future and far-future are shown in figures below.

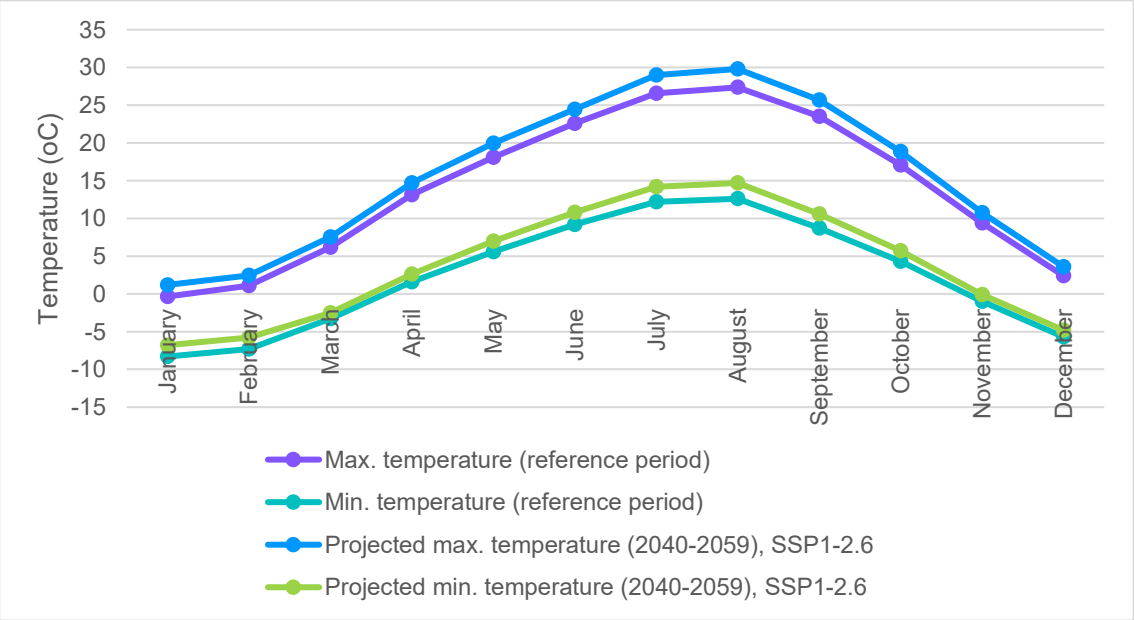


Figure 8.4: Projected absolute monthly maximum and minimum temperatures for the mid-future, Sivas, SSP1-2.6, 1995-2014 reference period (50th percentile)[74]

[74] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

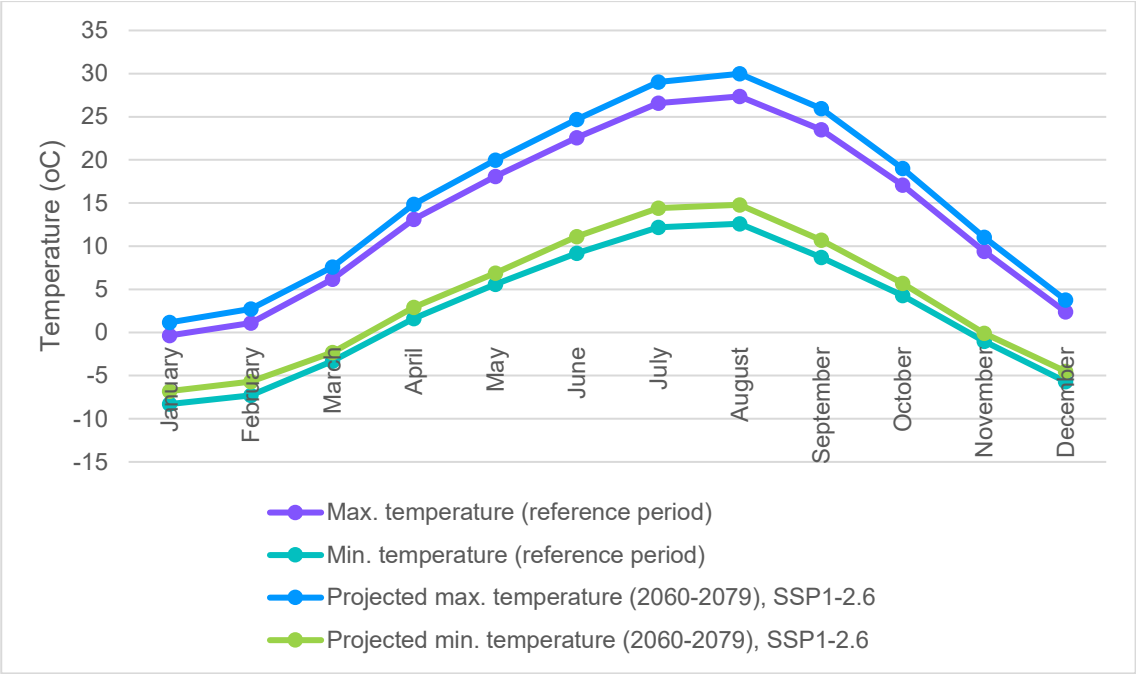


Figure 8.5: Projected absolute monthly maximum and minimum temperatures for the far-future, Sivas, SSP1-2.6, 1995-2014 reference period (50th percentile)[75]

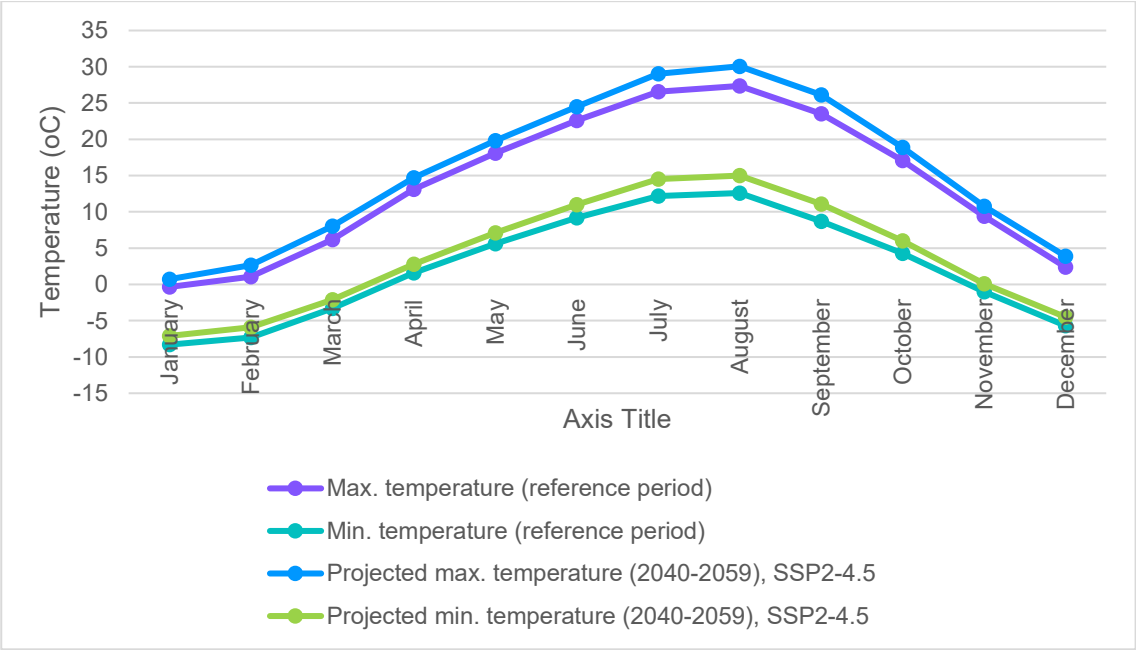


Figure 8.6: Projected absolute monthly maximum and minimum temperatures for the mid-future, Sivas, SSP2-4.5, 1995-2014 reference period (50th percentile)[76]

[75] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

[76] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

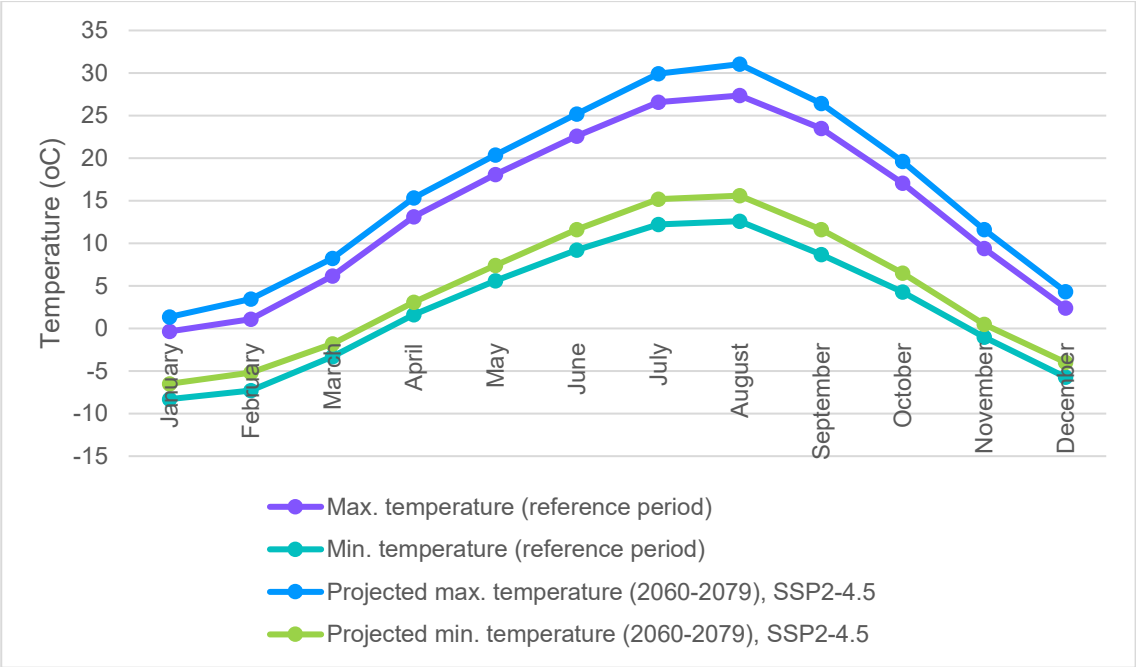


Figure 8.7: Projected absolute monthly maximum and minimum temperatures for the far-future, Sivas, SSP2-4.5, 1995-2014 reference period (50th percentile)[77]

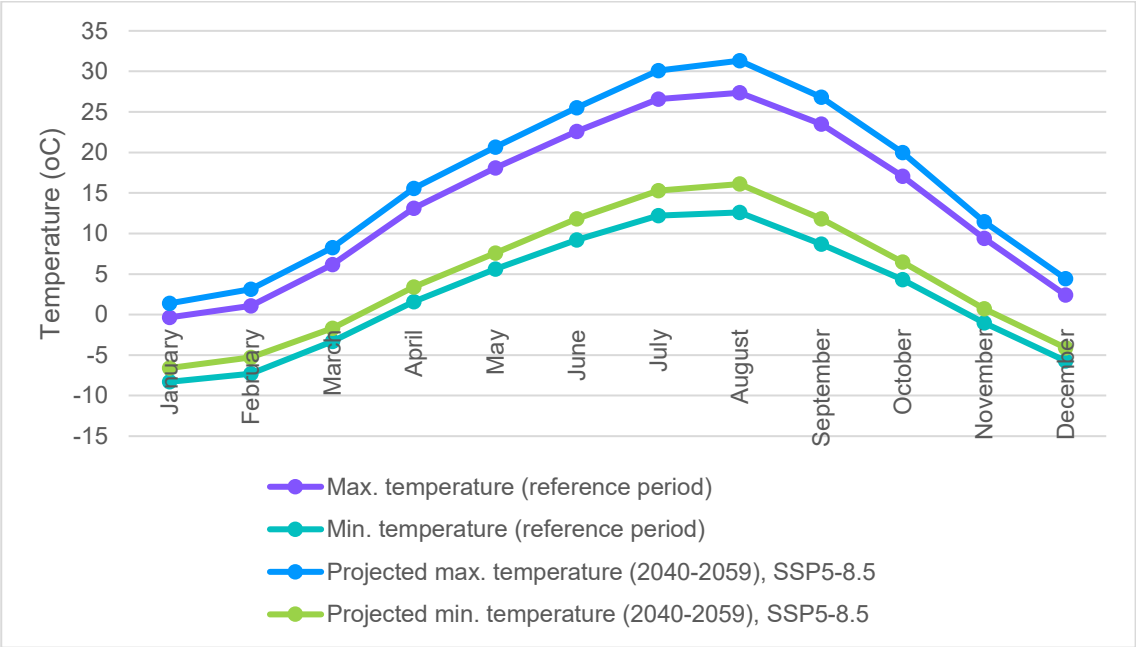


Figure 8.8: Projected absolute monthly maximum and minimum temperatures for the mid-future, Sivas, SSP5-8.5, 1995-2014 reference period (50th percentile)[78]

[77] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

[78] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

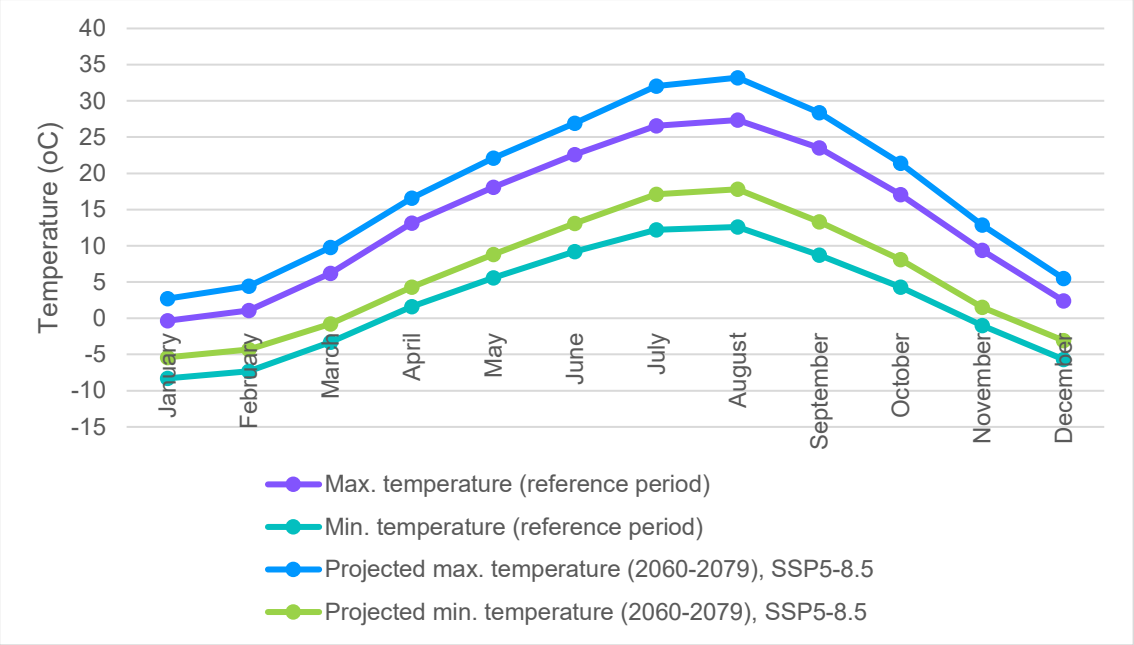


Figure 8.9: Projected absolute monthly maximum and minimum temperatures for the far-future, Sivas, SSP5-8.5, 1995-2014 reference period (50th percentile)[79]

Projected absolute monthly average precipitation for the mid-future and far-future for SSP1-2.6, SSP2-4.5, and SSP5-8.5 climate change scenarios are presented in Figure 8.10, Figure 8.11, and Figure 8.12 based on the data accessed via the World Bank CCKP.

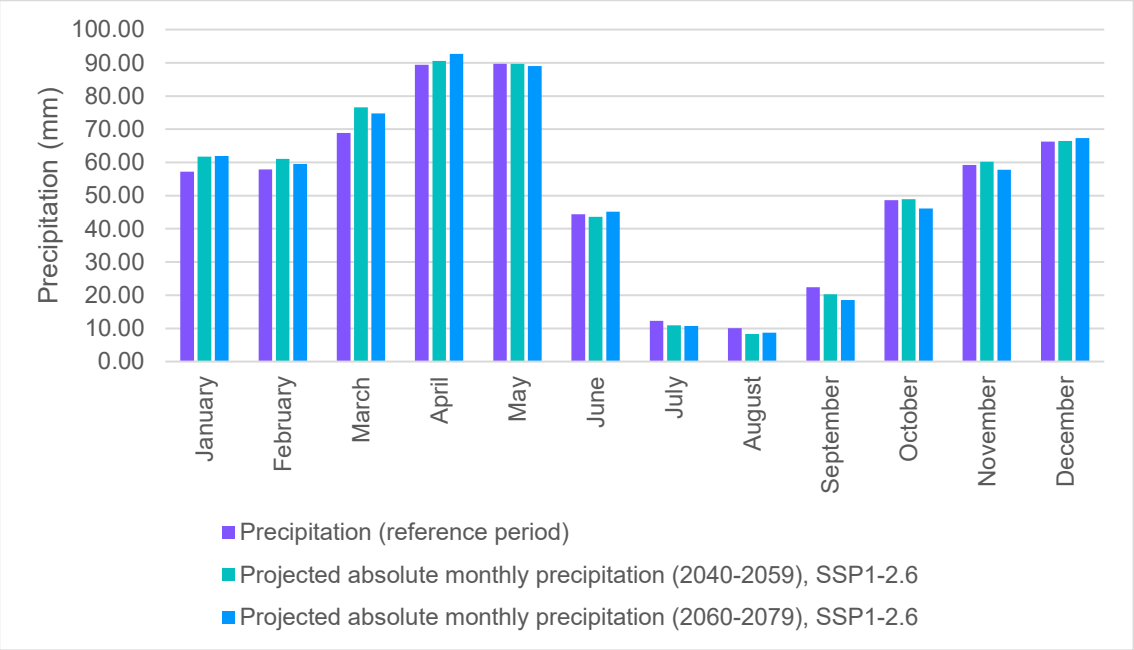


Figure 8.10: Projected absolute monthly average precipitation for the mid-future and far-future, Sivas, SSP1-2.6, 1995-2014 reference period (50th percentile)[80]

[79] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

[80] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

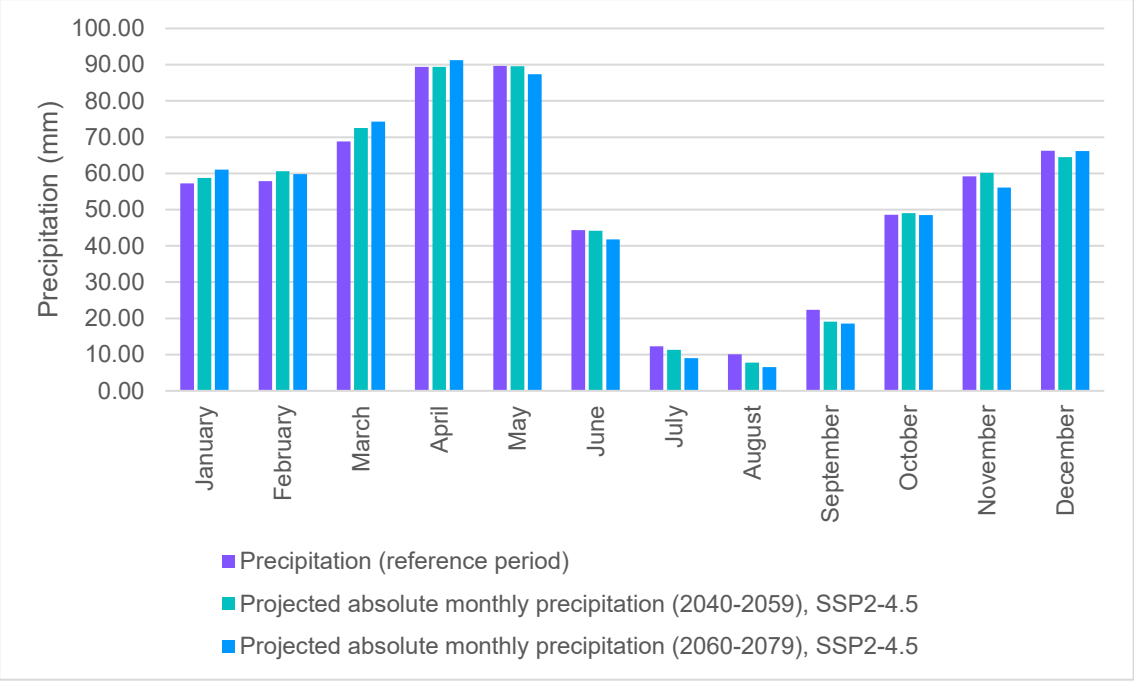


Figure 8.11: Projected absolute monthly average precipitation for the mid-future and far-future, Sivas, SSP2-4.5, 1995-2014 reference period (50th percentile)[81]

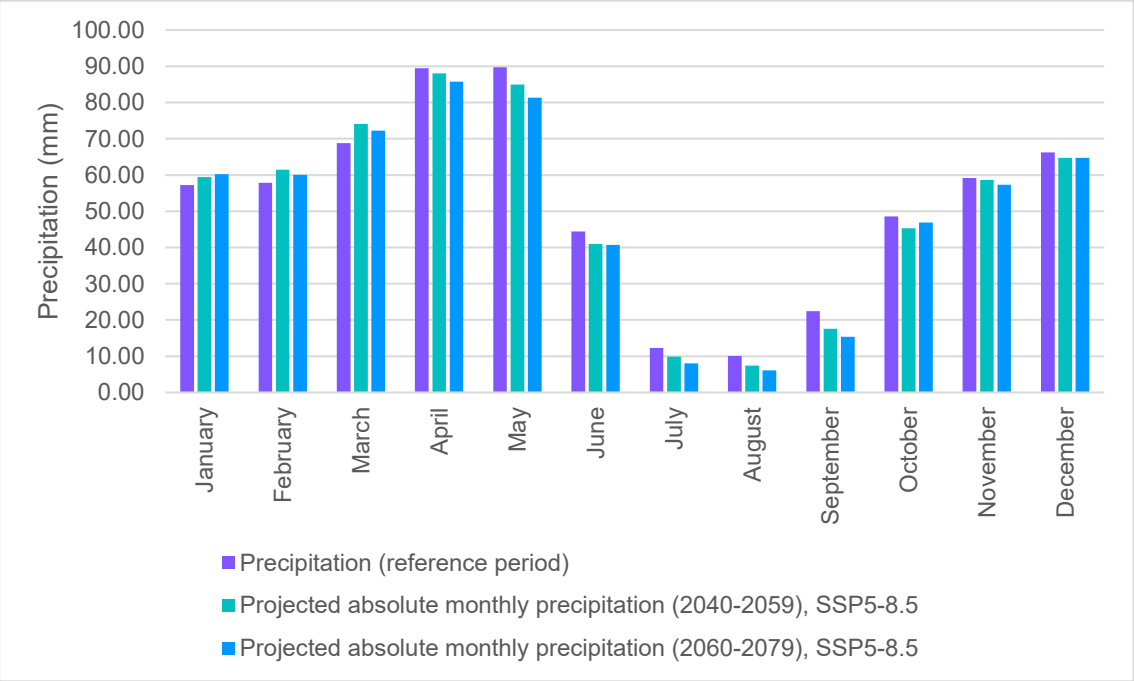


Figure 8.12: Projected absolute monthly average precipitation for the mid-future and far-future, Sivas, SSP5-8.5, 1995-2014 reference period (50th percentile)[82]

[81] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

[82] Produced by Mott MacDonald based on the data obtained from the World Bank CCKP

Changes in extreme weather events

In addition to changes in average mean, maximum, and minimum temperatures and precipitation regimes, climate change may also result in changes in extreme weather events.

Extreme Precipitation

Climate projections data for extreme precipitation events are available in the World Bank CCKP. The mid-future and far-future projected absolute average largest 5-day cumulative precipitation and number of days with precipitation greater than 20 mm for Sivas are presented in Table 8.10 and Table 8.11, respectively. Here, the data in November is presented since these are the highest recorded and projected ones.

Table 8.10: Projected absolute average largest 5-day cumulative precipitation in November for the mid-future and the far-future, Sivas, SSP1-2.6, SSP2-4.5 & SSP5-8.5, 1995-2014 reference period (50th percentile)[83]

Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
SSP1-2.6	58 mm	59 mm	59 mm
SSP2-4.5	58 mm	61 mm	62 mm
SSP5-8.5	58 mm	61 mm	65 mm

Table 8.11: Projected absolute number of days with precipitation >20mm in November for the mid-future and the far-future, Sivas, SSP1-2.6, SSP2-4.5 & SSP5-8.5, 1995-2014 reference period (50th percentile)[84]

Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
SSP1-2.6	0.2 days	0.2 days	0.3 days
SSP2-4.5	0.2 days	0.3 days	0.2 days
SSP5-8.5	0.2 days	0.2 days	0.3 days

Table 8.11 shows almost no change from the baseline for all climate change scenarios. A slight increase in the average largest 5-day cumulative rainfall in November is projected for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios both for the mid-future and far-future (Table 8.10). Therefore, the likelihood of occurrence of intense rainfall events varies depending on the scenario.

Cold waves

Table 8.12 and Table 8.13 show projected absolute number of frost and ice days with temperature below 0°C in January for SSP1-2.6, SSP2-4.5, and SSP5-8.5 climate change scenarios for the mid-future and the far-future based on the data accessed via the World Bank CCKP.

[83] Produced by Mott MacDonald based on the data available in the World Bank CCKP

[84] Produced by Mott MacDonald based on the data available in the World Bank CCKP.

Table 8.12: Projected absolute the number of frost days with temperature <0 ºC in January for the mid-future and the far-future, Sivas, SSP1-2.6, SSP2-4.5 & SSP5-8.5, 1995-2014 reference period (50th percentile)[85]

Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
SSP1-2.6	30 days	30 days	30 days
SSP2-4.5	30 days	30 days	29 days
SSP5-8.5	30 days	29 days	27 days

Table 8.13: Projected absolute number of ice days with temperature <0 ºC in January for the mid-future and the far-future, Sivas, SSP1-2.6, SSP2-4.5 & SSP5-8.5, 1995-2014 reference period (50th percentile)[86]

Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
SSP1-2.6	16 days	12 days	12 days
SSP2-4.5	16 days	13 days	12 days
SSP5-8.5	16 days	11 days	9 days

Based on the temperature projections presented before, alongside the projected number of frost days and ice days (temperature below 0ºC) (Table 8.12 and Table 8.13), the intensity and frequency of cold waves are not anticipated to increase for SSP1-2.6, SSP2-4.5, and SSP5-8.5 climate change scenarios both for the mid-future and far-future due to increasing surface temperatures.

Heatwaves

Table 8.14 shows projected absolute number of hot days with temperature greater than 35 oC in August for SSP1-2.6, SSP2-4.5, and SSP5-8.5 climate change scenarios for the mid-future and the far-future based on the data accessed via the World Bank CCKP.

Table 8.14: Projected absolute number of hot days with temperature >35 ºC in August for the mid-future and the far-future, Sivas, SSP1-2.6, SSP2-4.5 & SSP5-8.5, 1995-2014 reference period (50th percentile)[87]

Future scenario	Reference value (1995-2014)	Climate value for the mid-future (2040-2059)	Climate value for the far-future (2060-2079)
SSP1-2.6	0.1 days	1.4 days	1.7 days
SSP2-4.5	0.1 days	2.0 days	3.0 days
SSP5-8.5	0.1 days	3.9 days	8.9 days

Based on the temperature projections presented before, alongside the projected absolute number of hot days (temperature greater than 35ºC) (Table 8.14), the intensity and frequency of heatwaves are anticipated to follow an increasing trend due to increasing surface temperatures in particular for the worst-case scenario. This might affect the Project through overheating and failure of mechanical and electrical equipment and expansion and warping of metallic and plastic components, as well as reducing water availability for the different phases of the Project. This may be exacerbated through solar gain during cloud-free periods of summers.

[85] Produced by Mott MacDonald based on the data available in the World Bank CCKP
[86] Produced by Mott MacDonald based on the data available in the World Bank CCKP
[87] Produced by Mott MacDonald based on the data available in the World Bank CCKP

Storms

Increased surface temperatures may cause changes to the intensity and frequency of storms. Although the degree of change in winds and storms is not certain and there is no data for potential changes in storm track, intensity, and speed of storms, the changes are expected to include a trend towards stronger winds and intense storms. This might affect the Project through heavy rainfall and high winds, which may cause additional stress to structure and structural damage.

Flooding

Flooding due to surface runoff (pluvial flooding) may increase due to both development and changes in land cover, as well as changes in rainfall events. Furthermore, hotter temperatures may increase soil dryness and inability to absorb rainfall and thereby increase surface runoff potential and flash flood risk. A slight increase in the average largest 5-day cumulative rainfall in November is projected for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios both for the mid-future and far-future (Table 8.10). Thus, intense rainfall events are likely to increase in magnitude or frequency.

The Project, including project components and the substation to which the ETL will be connected, is located at a high mountain area (2,000m-2,350m), therefore any risk associated with the flooding is not anticipated.

Sea level rise

The Project is not located on a coastal area. Therefore, any risks associated with sea-level rise is not anticipated.

8.3.2 Greenhouse Gas (GHG) Emissions

According to the International Energy Agency (IEA), the energy sector is estimated to account for more than 75% of total GHG emissions on a global basis[88]. Türkiye's latest national GHG inventory to the UNFCCC disclosed annual emissions of around 524 Mt of CO_2e based on 2020 data[89]. The energy sector is the major source of GHG emissions in Türkiye, constituting 70% of total emissions with 368 Mt of CO_2e. The main contributor is energy industries accounting for 38.9% of total emissions, which is followed by transport sector with 20.5%, other sectors with 21.9%, and manufacturing industries with 16.4%. There is a 163.3% increase in the energy sector related GHG emissions between 1990-2020. In Table 8.15, national GHG emissions for 2020 by sector are also presented.

Table 8.15: 2020 GHG emissions by sector

Sector	Mt CO_2e
Energy	367.6
IPPU	66.8
Agriculture	73.2
Waste	16.4
Land use, land-use change, and forestry (LULUCF)	-56.9
Total (excluding LULUCF)	**523.9**
Total (with LULUCF)	**466.9**

[88] IEA (2023), Greenhouse Gas Emissions from Energy Data Explorer, IEA, Paris, Last accessed in November 2023 here: https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer.

[89] UNFCC (2022) Turkey. 2022 National Inventory Report (NIR), Last accessed in November 2023 here: https://unfccc.int/documents/461926.

According to 2023 national energy statistics shared by the Ministry of Energy and Natural Resources, the shares of resources in energy production are presented in Table 8.16. As seen from Table 8.16, 39.1% of energy is produced by renewable energy sources.

Table 8.16: The share of resources in energy production[90]

Resource	Share in production (%)
Coal	36.3%
Natural gas	21.4%
Hydropower	19.6%
Wind	10.4%
Solar	5.7%
Geothermal	3.4%
Others	3.2%

There is no anticipated significant release of GHG emissions associated with the Project activities during its operation because of the nature of the Project (i.e., wind renewable energy generation). When it becomes operational, the carbon intensity of the energy sector will reduce on a national basis and renewable energy capacity will increase nationally.

A greenhouse gas assessment is required to determine whether combined Scope 1 and Scope 2 emissions are expected to be more than 100,000 tonnes of CO_2 equivalent annually, according to EP IV[91], and 25,000 tonnes of CO_2 equivalent annually as stated both in the IFC PSs[92] and EBRD guidance[93]. If the Project is likely to exceed this threshold, then consideration must be given to relevant climate change transition risks (as defined by EP4 guidance) and an alternatives analysis completed which evaluates lower GHG intensive alternatives. However, it is expected that emissions during operation of the Project (e.g., emissions due to maintenance or renewal activities) will be minimal so it will be under the threshold requiring further assessment. Thus, it is aligned with the EP4, IFC PSs, and the EBRD requirements.

In this Assessment, the result is presented alongside the broader context of Türkiye's national GHG emissions inventory to provide context for the scale of the Project's contribution to reducing the carbon intensity of the energy sector.

8.4 Impact Assessment

8.4.1 Climate Change

As outlined in Section 8.3, climate projections for all climate change scenarios for Sivas include the following:

- Increase in both average and extreme temperatures particularly during summer,
- Increase in minimum temperatures particularly during winter,
- Decrease in monthly average precipitation particularly during winter,

[90] 2023 national energy statistics on energy shared by the Ministry of Energy and Natural Resources. Last accessed February 2024 here: https://enerji.gov.tr/infobank-energy-electricity.

[91] Equator Principles, Implementation Note, 2020. Last accessed November 2023 here: https://equator-principles.com/app/uploads/Implementation_Note_Sept2020.pdf

[92] IFC, Performance Standard 3, 2012. Last accessed November 2023 here: https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-3-en.pdf

[93] EBRD (2017) Protocol for Assessment of Greenhouse Gas Emissions. Last Accessed in March 2024 here: https://www.ebrd.com/documents/admin/ebrd-protocol-for-assessment-of-greenhouse-gas-emissions.pdf

- Increase in the frequency and/or intensity of extreme weather events such as heatwaves and storms.

Based on these climate trends and details provided within the baseline conditions, a range of climate hazards and their potential impacts on the Project receptors have been identified both for construction and operation phases and presented in Table 8.17 and Table 8.18.

8.4.1.1 Construction phase

The climate change risk assessment performed for the construction phase of the Project is presented in Table 8.17 and has been undertaken in line with the methodology presented in Section 8.2. It summarises the potential impacts to the Project's construction activities due to climate hazards affecting sensitivities of receptors and applies a risk rating to each potential impact.

Since the construction activities will take place over the short term, this assessment has been performed only for the mid-future. As outlined in Section 8.3.1.2, projected changes in most of climate variables are quite close to each other for SSP1-2.6, SSP2-4.5, and SSP5-8.5 scenarios, in part due to the time horizon used for this assessment, and as the difference between the scenarios widens more in the latter half of the century. For such cases, the likelihood of occurrence of climate hazard and severity of impact would be similar in a qualitative approach. Therefore, this assessment has been carried out only for the worst-case scenario (i.e., SSP5-8.5 scenario) for the mid-future.

Table 8.17: Climate change impact assessment for the construction phase

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)	Affected receptor(s)	Climate impact	Embedded mitigation action(s)	Severity of impact	Risk Rating	Potential mitigating action(s)	Residual Risk Rating
Increase in mean seasonal temperatures and extreme high summer temperatures during heatwaves	Almost certain	Construction equipment and machinery	Engines may overheat causing the machinery to be unusable.	N/A	Moderate	High	Operators will regularly inspect construction equipment and machinery, for example the coolant levels will be checked on a daily basis. Construction equipment and machinery will be cleaned regularly to prevent dust accumulation, which might block the airflow and cause overheating. Construction equipment and machinery will be shut down when they are not used to protect them from overheating. Construction equipment and machinery will not be stored under the direct influence of sunlight, for example they will be stored in cool and dry storage areas or underneath tarps or trees.	Negligible
		Office / welfare facilities	Overheating of office or welfare facilities, reducing productivity	N/A	Minor	Medium	Office / welfare facilities will be equipped with proper air conditioning system.	Negligible
		Staff health and safety	Heat stroke could occur in exposed locations. The decrease of workers will lead to delays to the schedule due to productivity being down if workers are ill or on leave therefore no one is available to operate the machinery.	N/A	Moderate	High	In the construction site, there will be air-conditioned areas for workers to rest. As the day gets warmer, construction workers will be allowed to take frequent breaks in air-conditioned areas and provided with plenty of drinking water. Proper PPE including mesh safety vests helping increase airflow, high-visibility clothing reflecting sunlight, cooling headbands or hardhat sweatbands will be provided to workers. The construction schedule will take into account the coldest and hottest hours of the day to limit the exposure, for example, the more physically demanding works will be carried out during the coldest hours of the day. Training will be provided to workers to raise awareness of heat-related stress symptoms.	Low
Increase in frequency and intensity of drought associated with low precipitation over a long period of time	Possible	Material storage / soil stockpiles / laydown area	Material and soil stockpiles dry out leading to more dust on site.	N/A	Minor	Low	Stockpile design will include measures to prevent dust generation and runoff (e.g., avoiding steep angles). Windbreaks (e.g., fencing or barriers) will be included around the stockpiles in the design. Dust suppression system will be available on the construction site. Stockpiles will be watered on a regular basis to keep its moisture content at a certain level. Air quality on the site will be monitored and reported on a regular basis.	Negligible
Increase in extreme high wind speeds and storm events	Possible	Material storage / soil stockpiles / laydown area	Materials and soil blown away creating dust on site	N/A	Minor	Low	Windbreaks (e.g. fencing or barriers), where necessary, will be placed at right angles and spacing to the prevailing wind currents in the design. To prevent dust formation on the site, dust suppression practices will be implemented on the construction site.	Negligible

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)	Affected receptor(s)	Climate impact	Embedded mitigation action(s)	Severity of impact	Risk Rating	Potential mitigating action(s)	Residual Risk Rating
		Office / welfare facilities	Damage from wind to temporary facilities, potentially making them unusable at times.	N/A	Minor	Low	Windbreaks as mentioned above, Items such as partially installed decking, roofs, walls, etc. that might be dismantled or damaged by high winds will be supported.	Negligible
		Construction workers' health and safety	Unsafe working conditions on site leading to restrictions on working time or activities being carried out. Potential delays to schedule.	N/A	Moderate	Medium	Emergency Response Plan will be prepared and implemented.	Low
Precipitation changes and increase in rainfall intensity during extreme events	Likely	Material storage / soil stockpiles / laydown area	Materials and soil have potential to runoff into watercourses; this could lead to pollution.	Necessary permission will be obtained from the State Hydraulic Work (DSI) for the material storage / stockpiles / laydown area.	Minor	Medium	Erosion controls, such as drainage channels, settling structures, etc., will be applied prior to site preparation and building activities, as part of the necessary control measures to prevent erosion risk. The waters from the Project surrounds and slopes will be separated from surface run-off by directing them through temporary channels and soil embankments, thereby eliminating the risk of erosion during periods of high rainfall. Following the excavation process, the slopes will be reinforced and all erosion control measures, including culvert outlets, will be put into place. Excavation material will be stored in a designated storage area with embankments around it to minimize soil erosion.	Low
		Construction equipment and machinery	Waterlogging of sites restricting ability of machinery to operate on wet ground	N/A	Minor	Medium	Emergency Response Plan will be prepared and implemented.	Low

8.4.1.2 Operation phase

The climate change risk assessment carried out for the operation phase of the Project is presented in Table 8.18 and has been undertaken in line with the methodology presented in Section 8.2. It summarises the potential impacts to the Project due to climate hazards affecting sensitivities of the Project assets and applies a risk rating to each potential impact.

As stated earlier in Section 8.4.1.1, projected changes in most of climate variables for climate change scenarios are quite close to each other in the mid-future and the far-future. For such cases, the likelihood of occurrence of climate hazard and severity of impact would be similar in a qualitative approach. Therefore, this assessment has been carried out for the worst-case scenario (i.e., SSP5-8.5) for the far-future to present the greatest extent of climate change impacts.

Embedded mitigations at this stage of design have been identified and considered in deriving the risk scores, but scores should be updated as design progresses and more detailed design information becomes available.

Table 8.18: Climate change impact assessment for the operation phase of the Project

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)	Affected receptor(s)	Climate impact	Embedded mitigation action(s)	Severity of impact	Risk Rating	Potential mitigating action(s)	Residual Risk Rating
Increase in mean seasonal temperatures and extreme high summer temperatures during heatwaves	Almost certain	Mechanical and electrical equipment and components	Fatigue and degradation of wind turbines consisting of wind turbine generators (WTGs), AC-DC convertors, and transformers and components of the switchyard such as power transformers due to extreme temperatures	The Project will be designed to include SCADA system, which allows for ongoing controlling and monitoring of the system during monitoring and maintenance. Parameters to be monitored will include the status of wind turbines and relevant ambient parameters such as temperature and wind speed. The components of wind turbines sensitive to high temperatures will be designed to include a cooling system including gear boxes, generators, converters, and transformers. In addition, those will be monitored continuously through temperature sensors. When temperatures are high, wind turbines then either runs at reduced power or stops. A nacelle cover containing the main mechanical and electrical components of wind turbines will be incorporated in the design to provide protection against weather conditions.	Minor	Medium	Mechanical and electrical components of wind turbines and substation will be reviewed to confirm that temperature tolerances include projected temperature increases. This will include elements that may be vulnerable to high temperature such as transformers and other substation equipment, Adequate cooling or capacity for fitting additional cooling will be included for the substation in future decades. Components and equipment of wind turbines and substation will be monitored during and inspected after heatwaves to identify any damage or deterioration and maintenance requirement. Ongoing monitoring of power production will be ensured during extremes to identify losses if any.	Low
			Expansion of metallic or plastic components and joints of moving parts		Minor	Medium		Low
			Increased failure rate of mechanical and electrical equipment, including safety critical equipment		Minor	Medium		Low
			Power storage and transmission reductions within the substation and transformers and hence decrease in net power generation		Insignificant	Low		Negligible
			Overheating of cables, and lower capacity of the cable to transmit energy		Minor	Medium		Low
Increased risk of wildfires, particularly associated with droughts and heatwaves	Possible	Building structure, Access roads and site roads,	Significant structural damage	Fire protection and suppression system will be included in the design.	Insignificant In the near vicinity of the Project, no forest area exists. In this regard, the severity of impact is considered to be insignificant.	Low	Emergency Response Plan will be prepared and implemented.	Negligible
		Staff access and health and safety	Significant risks to workers health		Insignificant	Low		Negligible
Reduced number of days with ice and frost (when temperatures are <0°C)	Almost certain	Building structure Machinery and equipment	Ice shedding and ice throw-related damage to structures or equipment	Ice shedding and ice throw assessments will be conducted for the final plant layout.	Insignificant Risk of ice-shedding and ice throw related damage will decrease with reduced number of days with temperatures below zero. Therefore, severity of impact is considered as insignificant.	Low	Regular maintenance activities will not be performed when temperature are below zero.	Negligible
Gradual change in average wind speeds	Possible	Power generation capacity	Power generation: Changes in wind patterns and effect on power generation (turbines cannot operate in very high or very low wind speeds)	There will be wind measuring systems (one main and one spare) to ensure that nacelle is automatically aligned to the wind so that the WPP can operate at low or high wind speeds.	Insignificant	Low	Power production will be continuously monitored to identify losses if any.	Negligible
Increase in extreme high wind speeds and storm events	Possible	Mechanical and electrical equipment and infrastructure including wind turbine blades, pilling, foundations and grounding, and moving parts and joints	Increased wear and tear on wind turbine blades resulting in reduced lifespan	The Project will be designed considering high wind speeds typical for the site. In extreme wind speeds, • When the nominal speed exceeds a pre-defined limit, wind turbines are to be stopped automatically. • Derating begins at 25.5m/s; Cut out point at 26 m/s into idling mode, • Storm control is enabled by default. In extreme wind conditions, the wind turbines are slightly braked by adjusting rotor blades.	Minor	Low	Weather data will be monitored, and equipment and infrastructure will be inspected during and after extremes, The effect that any increased wind speeds may have on wind turbines and substation will be reviewed and the need to upgrade equipment as part of operation and maintenance of the Project will be taken into account, in line with projected wind speeds for the lifetime of the Project.	Negligible
			Damage to infrastructure due to extreme high wind speeds, fallen trees		Moderate	Medium		Low

Associated climate-hazard	Likelihood of occurrence (of climate-hazard)	Affected receptor(s)	Climate impact	Embedded mitigation action(s)	Severity of impact	Risk Rating	Potential mitigating action(s)	Residual Risk Rating
Potential increase in frequency of lightning strikes due to increased frequency of storms	Unlikely	Electrical equipment Wind turbines to catch fire due to lightning strike	Damage to electrical equipment, leading to operation interruption.	Lightning and earthing protection systems will be included in the design.	Minor	Low	Given that the design will include lightning protection, the risk to infrastructure due to climate change is low. No further action is anticipated.	Negligible
Precipitation changes and increase in rainfall intensity during extreme events	Likely	Wind turbine blades	Potential to increase wear on wind turbine blades	As mentioned above, a nacelle cover containing the main electrical components of wind turbines will be incorporated in the design to provide protection against weather conditions.	Minor	Medium	Leading edge protection (LEP) will be applied to all blades against corrosion. Weather data will be monitored, and equipment and infrastructure will be inspected during and after extremes.	Low
		Electrical equipment	Damage to electrical equipment, resulting in risk of failures in the system/integrity		Moderate	Medium		Low

8.4.2 GHG Emissions

8.4.2.1 Construction

This section presents the assessment of construction related GHG emissions carried out following the methodology outlined in Section 8.2.3. Total Project emissions by scope are presented in Table 8.19.

Table 8.19: Project emissions by scope

Scope	tCO_2e	% of total
Scope 1	0	0%
Scope 2	130	0.15%
Scope 3	87,230	99.85%
Total	87,360	100%

The construction phase of the Project will last 13 months according to the construction schedule. Therefore, total Scope 1 and Scope 2 emissions arising from the construction phase are 120 tCO_2e per year, which is below the threshold value (25,000 tCO_2e/year) as per the IFC guidance. Construction emissions are also below 5% of the lifetime emissions avoided through this renewable energy development, therefore the Project is compliant with the EBRD guideline.

Table 8.20: Project whole life carbon emissions

Whole-life stage	tCO_2e	% of total emissions
A1 – A3	60,340	69.06%
A4	23,940	27.40%
A5	3,090	3,54%
Total	87,360	100%

The most five emitting components / activities of the Project are shown in Table 8.21.

Table 8.21: Project emissions hotspots

Component / activity	tCO_2e	% of total emissions
Rotor	27,472	31.45%
Material transport to the site	23,937	27.40%
Tower	12,632	14.46%
Foundations	12,138	13.89%
Transmission cables	4,037	4.62%

Table 8.22: Project emissions by material / activity

Material / activity	tCO_2e	% of total emissions
Fuel consumption	26,194	29.98%
Fiberglass	19,559	22.39%
Steel	18,916	21.65%
Concrete	12,138	13.89%
Iron	4,622	5.29%
Transmission cables	4,037	4.62%
Gravel	1,067	1.22%
On site waste	701	0.80%
On site power consumption	130	0.15%

Material / activity	tCO_2e	% of total emissions
Total	87,360	-

GHG emissions associated with the Project construction phase arise through the supply and transport of raw materials, manufacture of project components, transport to site, and construction installation processes (Figure 8.1). Based on the assessment of construction-related GHG emissions provided above and considering mainly the components / activities emitting the most GHG emissions (Table 8.21), the following measures are suggested to be implemented to minimise these sources of GHG emissions as far as possible:

- Implement appropriate waste management during construction works, adhering to the Waste Management Hierarchy to avoid and/or minimize on-site waste generation,
- Construction materials will be sourced locally where possible to minimise the amount of construction traffic movements,
- Construction related transport impact will be minimized through enhancement of transportation of construction materials and construction workers, for example by supplying materials from local sources to reduce transportation distance, improving vehicle efficiency by using efficient engines, using low-emissions vehicles, etc.
- Where possible, materials with low carbon footprint will be considered in the design.
- Design will be optimized to minimise the quantities of new raw materials required, for example by limited haul road widths, optimising design of foundations for turbines, etc.
- Sustainable construction management practices will be established to optimise energy efficiency measures during construction site work activities. This will include:
  - Toolbox talks for workers about switching off plant and construction equipment and machinery when not in use;
  - The use of energy zoning in construction site cabins to control energy usage; and
  - Regular servicing of plant and diesel-powered construction equipment and machinery.

8.4.2.2 Operation

Operational GHG Emissions

GHG emission sources during the operation phase of the Project will include emissions due to:

- Fuel consumption associated with on-site generators,
- Fuel consumption associated with maintenance and repair activities,
- Electricity consumption for lightning and security purposes (e.g., operating security systems, CCTV, etc.) when climate conditions (i.e., the wind speed) are not suitable for operating activities.[94]

Based on the activity data provided by the Project Company and publicly available emissions factor data for operating activities, Scope 1 and Scope 2 emissions arising from the fuel consumption by on-site generators and vehicles to be used for maintenance and repair activities have been assessed and presented in Table 8.23. There is no significant operational GHG emissions (63 tCO_2e per year) as seen from Table 8.23.

[94] The existing activities are the baseline for the estimation of the total electricity consumption. 2022 electricity data shared by the Project Company is taken into account in the assessment.

Table 8.23: Operational GHG emissions assessment

No.	Sources	Unit	Amount	Emissions by scope	GHG emissions			
					CO_2[95]	CH_4[95]	N_2O[95]	tCO_2e
1	**Fuel consumption associated with the use of on-site generators**							
1.1	Number of on-site generators	Quantity (qnt)	1	Scope 1	802	0	0	0.8
1.2	Operational time	hr/yr/qnt	-					
1.3	Total operation time	hr/yr	-					
1.4	Fuel consumption	L/hr	-					
1.5	Annual total fuel consumption	L/yr	297					
2	**Fuel consumption associated with maintenance and repair activities**							
2.1	Number of vehicles	qnt/month	3	Scope 1	292	0	0	0.3
2.2	Fuel consumption	L/km	7.5					
2.3	Annual total distance travelled (considering the distance to and from the project site)	km/month	40					
2.4	Monthly total fuel consumption	L/month	9					
2.5	Annual total fuel consumption	L/year	108					
3	**Electricity consumption (e.g., for lightning and security purposes purposes)**							
3.1	Annual electricity consumption	MWh/yr	140	Scope 2	-	-	-	62.3[96]

Avoided GHG Emissions

This section presents GHG emissions avoided per year during the operational phase of the Project, based on the estimation approach previously described in Section 8.2.3.2. As mentioned earlier, avoided GHG emissions associated with the Project is calculated based on a grid factor for GHG emissions that would be released if typical fossil fuel-based technology were used to meet this energy capacity.

Avoided GHG emissions compared to typical grid generation emissions are calculated and presented in Table 8.24. This calculation is made based on the Turkish national electricity grid emission factors calculated according to IPCC Electricity Grid Emission Factor Calculation Methodology Tool07.V07 and published by the Ministry of Energy and Natural Resources[97].

Table 8.24: GHG Emissions Avoided in tonnes of CO_2 equivalent per year

Electricity Production (MWh/year)	Emission Factor (tCO_2/MWh)	Avoided Emissions (tCO_2e/year)
280,000	0.6488	181,664

[95] 100-year Global Warming Potentials (GWPs) of CO_2, CH_4, and N_2O to be considered in the operational GHG emissions assessment are 1, 28, and 265, respectively. Last accessed in April 2024 here: https://ghgprotocol.org/sites/default/files/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_0.pdf.

[96] The emission factor was obtained from Turkish Electricity Generation and Electricity Consumption Point Emissions Factors Information Form published by the Ministry of Energy and Natural Resources.

[97] Turkish national electricity grid emission factors published by the Ministry of Energy and Natural Resources Last accessed in November 2023 here: https://enerji.gov.tr//Media/Dizin/EVCED/tr/%C3%87evreVe%C4%B0klim/%C4%B0klimDe%C4%9Fi%C5%9Fikli%C4%9Fi/TUESEmisyonFktr/Belgeler/Bform2020.pdf.

The avoided emissions shown in Table 8.24 above equate to approximately 0.03% of the country's annual emissions in 2020 year.

Lastly, it is significantly important to note that there are not anticipated to be any specific transition risks of concern, given that the Project is a renewable energy operation investment.

8.4.3 Summary

This assessment considers of the effects, and their significant, of future climate change as it applies to the infrastructure that forms the Project during construction and operation phases and the potential GHG effects arising from construction and operation of the Project in line with applicable guidelines and standards provided in Section 8.2.1.

The future baseline climate is outlined, which is broadly projected to include warmer winters with decreased precipitation, and hotter, drier summers associated with increased drought and high temperature risks. The future baseline has been constructed for the mid-future (2040-2059) taking into account the operational lifespan of the Project.

Construction and operation phase impacts include damage to physical project receptors, as well as environmental and social receptors due to high temperatures, wildfires, flooding, and extreme weather events (including storms, heavy winds, and lightning).

Obtaining required permissions from relevant authorities and having on-site generators constitute embedded mitigating actions for the construction phase. Those mitigations incorporated into the Project design for the operation phase mainly include continuous controlling and monitoring of the system containing the status of the wind energy converter and relevant ambient parameters such as rotor speed, temperature, wind speed, blade load, etc., extreme heat solutions such as cooling systems specifically for the components sensitive to high temperatures, and protection from extreme events including lightning and earthing protection systems.

Additional mitigation measures incorporated into the construction phase of the Project includes measures for protecting construction equipment and machinery, health and safety of construction workers, and environment against projected changes in climate. Also, monitoring and management plans required to reduce identified climate change-related risks to construction activities are presented. For the operation phase of the Project, those measures consist of recommendations for the Project design and those that will be incorporated into the operation phase of the Project including monitoring and management of impacts as they are observed during the lifetime of the Project and responses to this such as upgrades and replacements of equipment to reflect future projected temperatures at the time of their renewal.

With the inclusion of both embedded mitigations and additional mitigation measures, there are no potential significant effects (i.e., residual impacts) upon the Project identified because of climate change during construction and operation phases.

Based on the assessment of construction-related GHG emissions and mainly considering the components / activities emitting the most GHG emissions, several measures to minimise the carbon impact of the construction phase are recommended, including, supplying construction materials locally as much as possible, minimising construction related transport impact through enhancement of construction material and worker transportation logistics, preferring materials with low carbon footprint in the design where possible, optimizing design to minimise the quantities of new raw materials needed and establishing sustainable construction management practices to optimise energy efficiency measures during construction site work activities.

According to the operational GHG emissions assessment, the total of Scope 1 and Scope 2 emissions is 63 tCO_2e per year. As this is a renewable energy investment, there is no significant

GHG emissions arising from the operation of the Project. Also, avoided GHG emissions associated with the Project during the operational phase are within the scope of this assessment.

9 Noise and Vibration

9.1 Introduction

This chapter presents an assessment of the noise and vibration impacts that will be generated by the construction and operation of the Project.

In order to evaluate the potential impact of noise due to the construction and operation activities, a noise modelling study was undertaken covering the Project area and its surroundings.

This study addresses the noise and vibration impacts of the construction and operation phases of the Project. Noise and vibration related definitions, regulations and legal background, the methodology followed, results of noise modelling, potential impacts, and proposed mitigation measures are covered in this Chapter.

The goal of impact assessment is to evaluate the impact magnitude by analysing the ambient conditions and magnitude of potential impacts at receptor locations in order to identify appropriate mitigation measures.

Scope of the assessment covers the completion to the construction and operation periods. Impact assessments depending on the noise modelling are held by considering two-time intervals;

- Construction activities (earth works, truck routes)
- Operation activities (Turbine)

The anticipated activities at each receiver are modelled using the CadnaA acoustic modelling software. The predicted impacts are compared against criteria established for each critical location.

Noise impacts are assessed with the limits in accordance with the recommendations outlined in the IFC Environmental, Health, and Safety (EHS) Guidelines which is based on the Guidelines for Community Noise, World Health Organization (WHO), 1999 and local legal legislation Turkish Regulation on Environmental Noise Control (RENC) (Official Gazette Date/Number: 30.11.2022/32029). RENC was prepared in accordance with European Noise Directive's (END) noise indicators and standard methods.

Vibration impacts are assessed in compliance with RENC and the vibration damage criteria, defined in BS 5228-2:2009+A1:2014 which is an internationally recognised standard.

9.1.1 Definitions

Before explaining the studies that were undertaken, it is helpful to provide definitions of basic acoustic terms and concepts, as given below.

Sound: Sound is vibrational disturbance, exciting hearing mechanisms, transmitted in a predictable manner determined by the medium through which it propagates. To be audible, the disturbance must fall within the frequency range 20 Hz to 20,000 Hz.

Noise: Noise is typically defined as "unwanted sound", sound being the human sensation of pressure fluctuations in the air. Sound levels are expressed in decibels (dB) on a logarithmic scale, where 0 dB is nominally the "threshold of hearing" and 120 dB is nominally the "threshold of pain".

Background noise: Prevailing noise in at a particular location measured in the absence of noise generated by the activities being studied.

Baseline noise: Atmospheric air pressure defined as decibels at the absence of any air pressure deteriorating effect which can be considered as noise.

Average noise measurement results: Raw levels gathered from field in logarithmic average according to time frames of the day. (background or source + background)

Processed average noise measurement results: Levels gathered via eliminating extraneous noise events and noise events of other noise sources from field in logarithmic average according to time frames of the day. (baseline noise in terms of index characteristics)

Decibels (dB): The unit describing the amplitude of the sound. The human hear responds to sound logarithmically. The bel is a logarithm of the ratio of the two sound power levels (i.e., instantaneous sound power and reference sound power) and decibel is 1/10 bel.

Frequency: The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or Hz.

Sound pressure level (L_p): A logarithmic measure of the effective sound pressure of a sound relative to a reference value. It is measured in decibels (dB) above a standard reference level. The commonly used "zero" reference sound pressure in air is 20 micro-pascal RMS (root mean square), which is usually considered the threshold of human hearing (at 1 kHz).

Sound power level (L_w): Ten times the logarithm of the ratio of the sound power under consideration of the standard reference power of 1 pW ($10^{-12}\ W$). The quantity obtained is expressed in decibels.

Equivalent Sound Level (L_{eq}): Quantifies the noise environment as a single value of sound level for any desired duration. L_{eq} correlates well with the effects of noise on people. L_{eq} is also sometimes known as Average Sound Level.

L_{10}: Sound pressure level that is exceeded 10% of the time of measurement.

L_{90}: Sound pressure level that is exceeded 90% of the time of measurement.

A-Weighting: A measure of sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. To describe sound in a manner representative of the human ear's response, it is necessary to reduce the effects of the low and high frequencies with respect to medium frequencies. The resultant sound level is said to be A-weighted, and the units are in decibels (dBA).

Noise Barrier: A physical obstruction that is constructed between the noise source and the noise sensitive receptor(s) that lowers the noise level, examples include standalone noise walls, noise berms (earth or other material), and combination berm/wall systems.

Noise Berms: Noise barriers constructed from natural earthen materials such as soil, stone, rock, rubble, etc. in a natural, unsupported condition are termed, noise berms.

Noise Walls: Noise barrier systems that are manufactured according to a technical design and assembled on-site to obstruct the noise propagating from noise source to receptors.

C-Weighting: A measure of sound pressure level designed to reflect the response of the human ear, for higher levels above 100 dB when the human ear's response is flatter.

L_{Aeq}: A weighted equivalent sound pressure level.

L_{Amax}: The maximum a weighted sound pressure level detected in the measurement time domain.

L_{Ceq}: C weighted equivalent sound pressure level.

L_{day}: Equivalent continuous sound pressure level for reference time interval day.

L_{eve}: Equivalent continuous sound pressure level for reference time interval evening.

L_{night}: Equivalent continuous sound pressure level for reference time interval night.

L_{dn}: Day-night-weighted sound pressure level. Day time defined in between 07:00-23:00, and night time defined as 23:00-07:00.

L_{den}: Day, evening- night weighted sound pressure level. Day time defined in between 07:00-19:00, evening time between 19:00-23:00, night time between 23:00-07:00.

Point Source: A source of sound which is concentrated to a point.

Area Source: A source of sound which is distributed over an area.

Line Source: A source of sound emanating from a linear geometry.

The threshold of perception of the human ear is approximately 3 dB, and a 5 dB change is considered to be clearly noticeable to the ear. This is primarily due to the logarithmic measuring metric typically associated with decibels.

Table 9.1: Perception of Sound

Change in sound level	Perceived Change to the Human Ear
± 1 dB	Not perceptible
± 3 dB	Threshold of perception
± 5 dB	Clearly noticeable
± 10 dB	Twice as loud
± 20 dB	Four-fold change

9.1.2 Specific Objectives

The specific objectives of the impact assessment are to:

- Identify the main sources of potential impacts to ambient noise and vibration from project activities during construction and operation phases,
- Assess noise and vibration impacts on sensitive receptors in the vicinity of project area,
- Suggest mitigation measures and determine the residual impacts.

9.1.3 Potential Sources

Potential sources of noise and vibration can be outlined as:

- Noise generated by construction works.
- Noise generated from earth-moving trucks' activities on road route during the construction period.
- Noise generated turbine activities for operation phase.
- Vibration caused by construction activities.
- Blasting vibration

9.2 Methodology

9.2.1 Applicable Guidelines and Standards

In this section, national and international legal requirements and applicable standards for the noise and vibration assessment for both construction and operation phase are described.

9.2.1.1 National Noise Requirements

Environmental noise and vibration levels are regulated by the RENC (Official Gazette (OG) Date/Number: 30.11.2022/32029). RENC was prepared in accordance with END noise indicators and standard methods.

Noise limits for construction activities are defined in terms of time limitations in RENC. Table 9.2 demonstrates the related time limitations for environmental noise generating activities around residential areas.

Table 9.2: The Allowed Time Frame for Outdoor Activities in Residential Areas

Activity	Time
Construction site activities	10.00 – 20.00

Related to the operation phase of the Project, limit value for noise emission sources of industrial facilities to the surrounding buildings in the RENC is presented in Table 9.3.This table presents maximum allowable environmental noise levels that shall be met at the nearest off-site receptor.

Table 9.3: Limit Values for Environmental Noise Level

Source Type	Measurement Parameters	Environmental Noise Level		
		Day (07.00-19.00)	Evening (19.00-23.00)	Night (23.00-07.00)
Industrial Facilities	LA_{eq}	65 dB(A)	60 dB(A)	55 dB(A)

9.2.1.2 International Noise Requirements

The international guidelines in the assessment of noise levels followed in this study is outlined in the World Bank Group's & IFC's Environmental, Health and Safety Guidelines (2007). The guideline refers to the World Health Organizations (WHO), Guidelines for Community Noise (WHO, 1999). Noise limits defined in this guideline will be obligatory to follow in this scope of the project. Noise limits are presented in Table 9.4.

The values presented can be applied to both the construction and operation phases of the project. The noise levels should not exceed the levels presented in Table 9.4 or result in a maximum increase in current background levels of 3 dB at the nearest receptor location off-site.

Table 9.4: WBG - IFC Noise Level Guidelines

Receptor	Day time (07:00 - 23:00)	Night time (23:00 - 07:00)
Residential areas	55 dBA	45 dBA
Commercial/industrial areas	70 dBA	70 dBA

WHO states cumulative noise level limits, which depend on the background noise levels, meaning noise levels to be evaluated, will consist of the logarithmic sum of noise from source and baseline noise levels. To evaluate cumulative noise levels, the summation of background noise and Project noise exposure is assessed. When the cumulative noise levels are less than the guidance values of L_{day}= 55 dBA and L_{night}= 45 dBA, the limits are set to these values. Alternatively, the cumulative noise levels should not exceed background noise by more than 3 dBA, for example in cases where the background noise levels already exceed the standards.

The impact assessment considers the arithmetic difference between the cumulative background and Project noise and the limit values. The impact magnitude considers the increase in noise.

9.2.1.3 National Vibration Requirements

Vibration levels are regulated by Turkish Regulation on RENC. Related vibration limits on the ground are defined for construction operations and machinery/equipment vibration. These are presented below.

The maximum allowable vibration impact levels due to the construction operations, at the nearest receiving structure are presented in Table 9.5.

Table 9.5: The maximum permissible values of ground vibrations caused by pile driving and similar vibration - generating operations in construction and construction machinery outside the nearest structure (in frequency bands between 1Hz - 80Hz)

Land Use Type	Maximum Permissible Vibration Velocity (Peak Value - mm/s)	
	Continuous Vibration	Discontinuous Vibration
Settlement Areas	5	10

The maximum permissible vibration levels for operation according to the RENC are presented in Table 9.6.

Table 9.6: The maximum permissible values of ground vibrations caused by railway and road transport vehicles, workplaces and industrial facilities in the nearest building and ground vibrations caused by machinery and equipment in the building

Location	Vibration Frequency (Hz)	Maximum Permissible Vibration Velocity (rms (mm/s))
Residential	1	1,5
	8-100	0,3

Table 9.7: The maximum permitted levels of ground vibrations in the nearest structure caused by vibrations due to blasting in mines, quarries and similar areas

Structure Type	Maximum Vibration Velocity at the Base of Buildings, (mm/s) (by frequency, f=Hz)			On the furnishing of the top floor for all frequencies
	f= 1-10	f=10-50	f=50-100(1)	
Solid structures such as houses, bricks and concrete	5	15	20	15

9.2.1.4 International Vibration Requirements

Vibration criteria are defined in "BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites" which defines vibration limits for humans and which could result in cosmetic damage to buildings.

Table 9.8 Guidance on Effects of Vibration Levels on Humans

Vibration level $[mm/s]$	Effect
0,14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0,3	Vibration might be just perceptible in residential environments.
1,0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than very brief exposure to this level.

Source: BS 5228-2:2009. Code of practice for noise and vibration control on construction and open sites.

9.2.2 Study Area and Area of Influence (AoI)

The Project's area of influence for noise impact is determined as the consideration of elevation and horizontal distance differences from the possible noise sources to receivers. 500 m distance was used for AoI.

Accordingly, baseline noise measurements were conducted at the potentially impacted settlements and noise model was prepared to cover potential impact zones.

9.2.3 Impact Assessment Methodology

In order to evaluate the significance of impact from the project, magnitude of impact and responsivity of the receptors need to be identified throughout the Project area.

Magnitude of impact is a parameter defined as characteristics of impact and Project. On the other hand, responsivity defined as characteristics of receptors.

9.2.3.1 Significance of Impact

The category of *significance* is identified based on the combinations of *magnitude* and *responsivity* of receptors in accordance with Table 9.9.

Table 9.9 Determination of Impact Significance

Magnitude of Impact	Responsivity of Receptor		
	Low	***Medium***	***High***
No Impact	No Impact		
Negligible	Negligible		Minor
Small	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
Large	Moderate	Major	

Responsivity of Receptors

The second component in the evaluation of impact *significance* is the *responsivity* of a potentially affected receptor.

The term "*responsivity*" refers to a set of characteristics that include:

- Importance of the receptor and
- Sensitivity of the receptor to the impact.

The category of responsivity is identified based on the combinations of *importance* and *sensitivity* of receptors in accordance with the *responsivity* matrix (Table 9.10).

Table 9.10: Determination of Responsivity of Receptors

Importance	Sensitivity		
	Low	*Medium*	*High*
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

Importance of Receptors

In general, evaluation of *importance* of the affected receptors is based on the following considerations:

- Protected status;
- Policy of the regional government.
- Stakeholder opinion.
- Economic value.
- Special features of ecosystems, such as resistance to change, rarity, adaptability, diversity, fragility and the ability to recover.
- Importance of individual components as environmental components.

If one of the above considerations is applicable, importance can be subjectively evaluated as medium or high. Otherwise, the importance is considered as low.

Sensitivity of Receptors

Sensitivity of a receptor depends upon the ability to recover for ecological receptors and the type of building use for human receptors Table 9.11.

Table 9.11 Designation of Sensitivity of Receptors

Sensitivity	Receptor
Low	High ability to recover the initial properties and functions, minor changes of spatial and dynamic indicators. Office Buildings, farm buildings, industrial or commercial facilities.
Medium	Limited / low ability to recover the initial properties and functions. Measures to minimize disturbance of ecosystems are required. Residential Buildings, hotels.
High	Lack of ability to recover the initial properties and functions. Irreversible disturbances may be caused by minor impacts. Recreational facilities, educational facilities, and health care centers.

9.2.3.2 Magnitude of Impact

The magnitude of impacts is determined from a combination of the extent and the scale of impact. (Table 9.12)

Table 9.12: Determination of Impact Magnitude

Extent	Scale				
	No Impact	*Small*	*Medium*	*Large*	*Very Large*
Single	*No impact*	Negligible		Small	
Site		Small	Medium		Large
Local		Medium		Large	
Regional		Medium	Large		

Extent of Impact

The impact extent which is detailed in Table 9.13: characterizes the spatial distribution of the impact. Impact assessment points are chosen to represent receptors in the area in which they are located. When it comes to broader regions, the influence becomes more extensive.

Table 9.13: Categories of Impact Extent

Noise impact extent category	Criteria
Single	Possible noise and/or vibration impact on a single building.
Site	Possible noise and/or vibration impact on 5 - 10 buildings.
Local	Possible noise and/or vibration impact on 10 - 100 buildings.
Regional	Possible noise and/or vibration impact on 100 - 1000 buildings

Scale of Impact

The scale of noise impact is the measure of how much noise is cumulated over limiting values at receptor locations. Noise receptors are residential, office, institutional, educational, health centres and commercial buildings.

Criteria for evaluation of the scale of noise impact are based on the RENC and WHO's Guideline's limiting values.

Scale of noise impact is evaluated according to exceedance level from the background. Time based noise metrics will be used for this kind of assessment procedure mainly L_{day} and L_{night}.

Any levels greater than the WBG - IFC's noise level limits will be noted down as exceedance. Criteria to classify the scale of a noise impact during construction and operation are detailed in Table 9.14.

Table 9.14 Scale of Noise Impact

Noise impact scale Category	Exceedance of noise limits WBG - IFC Criteria
No Impact	<1
Small	1-3
Medium	3-5
Large	5-8
Very Large	>8
*Criteria: Day time: 07:00 – 22:00, $L_{day} = 55\ dBA$; Night time: 22:00 – 07:00, $Lnight = 45\ dBA$	

While determining the noise impact scale classification; "Guidelines for Environmental Noise Impact Assessment" document from "Institute of Environmental Management and Assessment" is used.

Mentioned document defines sensitivity of receptors to noise level exposure's relative change using a similar approach.

Vibration impacts need to be evaluated for construction and operation.

Construction Vibration

Vibration assessment criteria are presented in Table 9.15.

Table 9.15: Scale of Construction and Operation Vibration Impact

Category of construction vibration impact scale	PPV (mm/s)
No Impact	<0,14
Negligible	<0,3
Small	<1
Medium	<10
Large	>10

9.2.4 Possible Mitigation Alternatives

Possible mitigation measures that should be considered for construction and operation are explained in this section.

Presented mitigations are generally used methods for similar projects. In case of an impact, source-specific measures specific to this Project are evaluated and presented in section 9.5 Impact Mitigation & Residual Impact.

9.2.4.1 Construction Mitigation Alternatives

The following possible mitigation measures may be considered during the construction phase of the Project;

- Optimizing working routines and conditions for construction sites

- Implementing periodic maintenance of construction machine/equipment
- Minimizing truck movements and limiting speeds at locations where trucks

Construction Vibration Mitigation Alternatives

- Routing of heavy vehicles away from residential streets or to areas with the least number of houses,
- Spreading of activities which cause vibration over time so that multiple activities that generate vibration do not occur at the same time. When each vibration source acts independently, the total vibration level generated may be significantly lower.
- Avoiding night-time activities and times determined to be sensitive through stakeholder engagement (i.e. prayer times)
- Limiting activities that cause vibration to day-time hours in residential areas as sensitivity to vibration increases at the night.

9.2.4.2 Operation Mitigation Alternatives

If Moderate or Major impacts are detected in terms of operational noise following possible strategies could be followed in order to mitigate operational noise;

- Re-arrangement of the turbine locations.
- Optimization of turbines with less noisy models.

9.2.5 Limitations and Assumptions

This section presents assumptions and limitations related to the calculations and modelling efforts during this Project.

9.2.5.1 Construction

- For construction noise modelling, given machine equipment assumed to be working on a reasonable construction polygon simultaneously and at full performance.
- Calculations and assessment procedures are accurate in line with the accuracy and detail level of the provided information and project documents.
- It is assumed that construction activities will be carried out in accordance with the time periods specified in the RENC (construction is limited between 10:00-20:00) and that no construction will take place during the night period.
- The site access road is assumed to be used only during the daytime.
- It is assumed that each truck given claimed to be used during construction works, performs 3 trips during the day period on the site access road.
- Site access road assumed to be rocky rural road and truck speeds are taken as 20 km/h.
- During construction works, access to the ETL will be provided via site access roads and any transportation needs regarding ETL is included in the total constructional machine/equipment.

9.2.5.2 Operation

- For operation noise modelling, given turbines assumed to be working simultaneously and at full performance.
- Modelling results can only consider to be accurate parallel to the accuracy and extent of the given information and documents.
- No impact or significant noise from ETL is expected for operation phase of the Project.

9.3 Baseline Conditions

In order to understand the current noise status, baseline noise measurements were conducted in April 2024.

9.3.1 Measurement Locations

Measurements were carried out at five locations which were selected as the closest residential areas to Project area. During the measurement period, ISO 1996-2 Standard was followed and IEC 61672 – 1 type 1 sound level meters were used. Measurements were conducted for 48 hours.

Baseline noise measurement locations are presented in Figure 9.1; whereas information of the measurement locations are presented in Table 9.16.

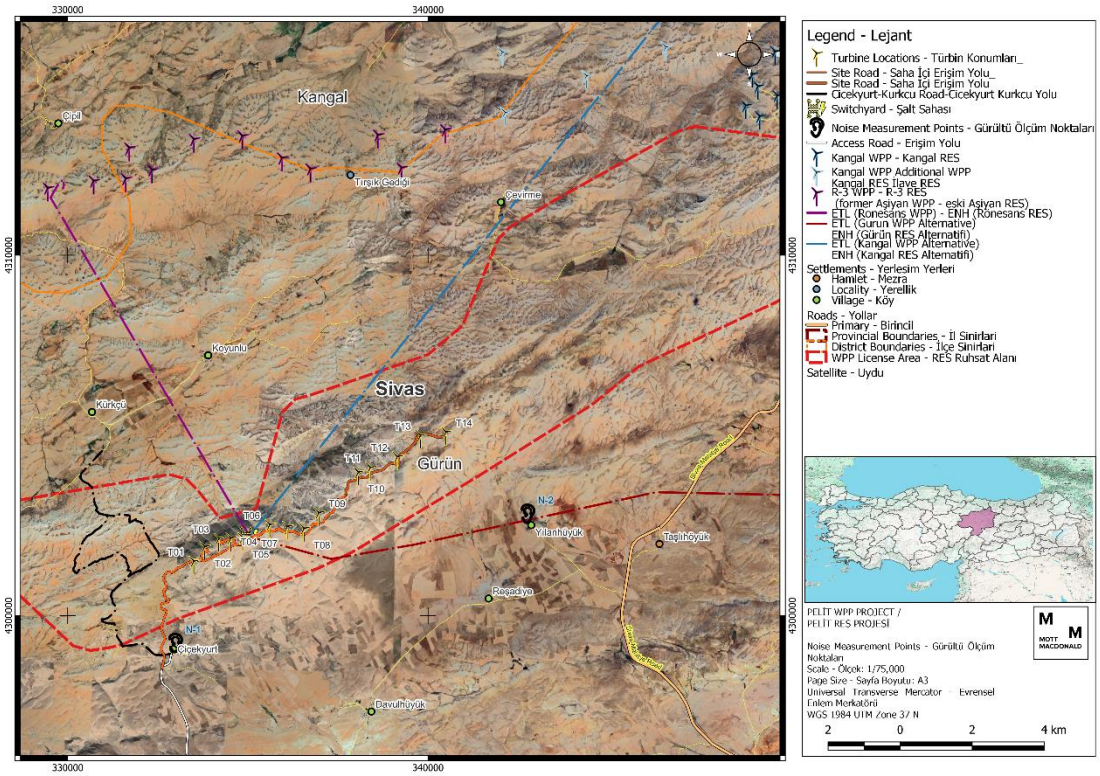


Figure 9.1: Baseline Measurement Locations

Information of the measurement locations are presented in Table 9.16.

Table 9.16: Information of Measurement Locations

Points	Latitude	Longitude	Designated Land Use
Point 1	38.826137°	37.076054°	Residential
Point 2	38.860228°	37.187837°	Residential

Fundamental information about measurement locations and the reasoning for selecting those points can be explained as follows;

Point 1 was located at a residential building. In order to determine baseline noise condition of the nearest rural settlement to closest turbines, sound level meter was located this region. Measurement photo is presented in Figure 9.2.

Figure 9.2: Measurement Point 1

Point 2 was located at a residential building. In order to determine baseline noise condition of the nearest rural settlement to closest turbines, sound level meter was located this region. Measurement photo is presented in Figure 9.3.

Figure 9.3: Measurement Point 2

Extraneous noise events were excluded from raw data. It means that detecting and eliminating noise events during measurement period which are completely irrelevant to the noise source tried to be measured. The detailed noise measurement results as per one-hour intervals equivalent noise levels are submitted in Appendix A.

Measurement results are presented in Table 9.17 for RENC and Table 9.18 for international standards.

Table 9.17: Baseline Noise Measurement Results for RENC (L_{den})

Measurement Location	Lday (dBA)	Levening (dBA)	Lnight (dBA)
Point 1	44,8	42,9	38,2
Point 2	43,4	41,5	37,4

Table 9.18: Baseline Noise Measurement Results for International Standards (L_{dn})

Measurement Location	Lday (dBA)	Lnight (dBA)
Point 1	44,4	39,6
Point 2	43,0	38,2

9.3.2 Identified Receptors

To evaluate the noise and vibration impact of the project, assessment points to those covered by the background monitoring were selected. These locations represent a set of receptors which have the same, or similar, background characteristics in terms of environmental noise levels and impact from the project. Moreover, evaluated receptors are representative locations which have the highest chance of being affected by noise & vibration during construction and operation activities of the Project. Most of the cases closest receptors to the nearest plant activity are the ones who have the highest chance of being affected.

While determination of assessment points, access road activities for construction phase is also considered. Some assessment points have impact of only truck traffics.

The details of identified receivers with the representative measurement points are presented in Table 9.19

Table 9.19: Identified Receivers (Assessment Points)

Assessment Points	Representative Measurement Points	Comments	Extent	Sensitivity	Importance
AP 1	1	Residential	Local	Medium	Medium
AP 2	2	Residential	Local	Medium	Medium
AP 3	2	Residential	Local	Medium	Medium
AP 4	2	Residential	Local	Medium	Medium
AP 5	2	Residential	Local	Medium	Medium
AP 6	2	Residential	Local	Medium	Medium
AP 7	1	Residential	Local	Medium	Medium
AP 8	1	Residential	Site	Medium	Medium
AP 9	1	Residential	Local	Medium	Medium

Satellite view of the assessment points are presented in Figure 9.4.

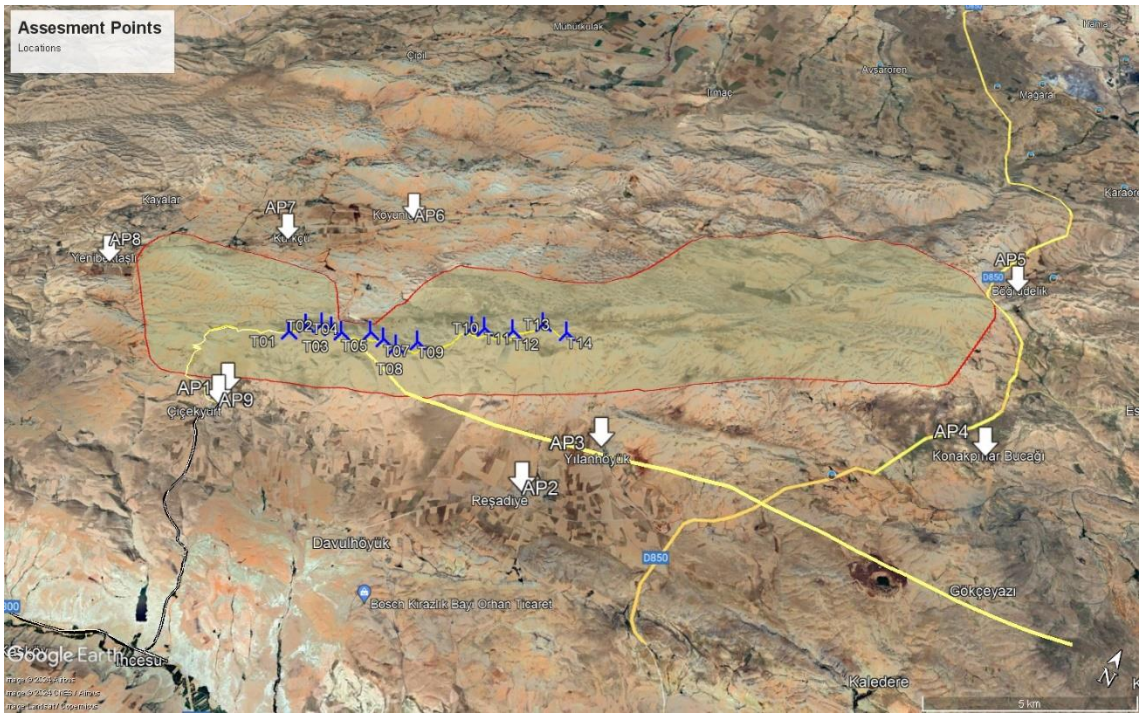


Figure 9.4: Satellite View of the Assessment Points

9.4 Impact Assessment

9.4.1 Methodology

The methodology used for the noise and vibration calculations is presented in this section. For the construction and operation phase, environmental noise and vibration levels were calculated by using appropriate methods taking into account related noise sources.

9.4.1.1 Noise Modelling

A noise model was developed using commercial noise modelling software CadnaA from Datakustik. The calculation parameters and sound source levels for the modelling and the methods are described in this section.

The input data to the noise model has an essential importance on the significance of the noise model. In this section the noise model input data for operation and construction phases will be explained.

Since sound propagation is hugely affected by terrain which can act as an obstacle to noise, information on ground topography was considered in the noise model. Ground topography data around the project area was used to develop the model.

Ground sound absorption (G) varies between 0 for hard - reflective surfaces and 1 for soft - absorptive surfaces. When calculating noise propagation, G values was considered as 0,9; because region is rural and far away from reinforced concrete structures.

Meteorological data (average relative humidity, average temperature, wind frequencies) were included in the noise mapping software to calculate the most suitable sound propagation conditions. Meteorological attenuation parameters – Cmet - are considered as 1.5, 0.7 and 0 for day, evening and night periods respectively. Given the nature of noise propagation, this means night and evening noise levels would be slightly higher than the daytime levels with same model input.

Buildings are introduced to prepare 3D noise propagation model where relevant data exists.

9.4.1.2 Construction Noise

In most cases, the logical way to express construction noise is to create area noise sources within the noise modelling software. Since extensive quantity of construction equipment will be used during the construction period, it may be problematic to represent the real noise case into modelling software.

Information about construction phases in the documents provided by the client were analyzed and construction areas were determined. It was assumed that all equipment and machinery would be operating simultaneously; leading the noise model to present a worst-case.

Regarding ETL facilities which are incorporated with the plant considered to be negligible as only one unit of each type of construction equipment will be used (which means there will not be any simultaneous construction works) and all construction processes for ETL lines (sub structure, super structure and string application) will last for six months in total.

In the noise model, the construction zones are defined using area noise sources. The total sound power level of all equipment was homogeneously assigned to the construction areas.

The given construction machine/equipment list is presented in Table 9.20.

Table 9.20: Construction Machines/Equipment List

Plant	Quantity	% on-time	Unweighted Octave Band Sound Power Level [dB]								Sound Power Level (dBA)	Total Corrected Sound Power Level	Referance
			63 Hz	125 Hz	250 Hz	500 Hz	1k Hz	2k Hz	4k Hz	8k Hz			
Excavator	12	30	104	101	90	94	90	87	82	77	96	**102**	BS 5228: Tab C.6 #28
Grader	2	40	96	95	91	90	90	89	82	75	95	**94**	BS 5228: Tab C.4 #14
Compactor	4	30	100	104	104	98	97	95	91	86	103	**104**	BS 5228: Tab C.6 #31
Water Truck	2	30	117	118	109	101	102	98	96	92	108	**106**	BS 5228: Tab C.2 #10
Loader	3	30	88	81	77	80	79	76	71	61	83	**83**	BS 5228: Tab C.2 #9
Dozer	1	30	108	107	101	102	101	101	92	83	106	**101**	BS 5228: Tab C.4 #73
Back hoe loeder	2	20	102	94	92	92	91	88	87	78	96	**92**	BS 5228: Tab C.4 #91
Concrete Mixer	10	20	111	102	94	97	98	106	88	83	108	**111**	BS 5228: Tab C.4 #69
Truck	12	30	108	109	103	107	101	102	98	93	109	**115**	BS 5228: Tab C.6 #37
Total Sound Power Level (dBA)			**117**	**94**	**103**	**104**	**111**	**109**	**113**	**106**	**117**		
Sound Power Level per area Lw" (dBA/m2)			**73**	**50**	**59**	**60**	**67**	**65**	**69**	**62**	**73**		
Constrution Area(m2)			**25000**										

In addition to the machinery and equipment list, truck traffic activities were also modelled for construction phase. Truck routes provided by the Project Company were implemented into the model for only daytime period.

9.4.1.3 Operation Noise

The noise source for operation phase is wind turbines. Planned turbines' specifications are listed in Table 9.21.

Table 9.21: Turbine Specifications

Turbine	Nominal Power (kW)	Hub Height (m)	Sound Power Level (dBA)
T1-T14	5900	108	106,4

9.4.1.4 Construction Vibration

Vibration analyses were conducted for construction phase. There is no vibration impact expected for operation phase of the Project.

Vibration during the construction stage is mostly caused by earthworks. It was assumed that machines which occurs maximum vibration impact, will work at the closest construction polygon to receiving location. Thus, worst case scenario was studied.

Calculations were conducted according to the information and reference vibration levels gathered from FTA document. The reference vibration value is accepted as loaded trucks activities according to the FTA. The reference values are presented in Table 9.22.

Table 9.22: Reference Vibration Levels of Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approximate Lv at 25 ft
Pile Driver (impact)	upper range	1,518	112
	typical	0,644	104
Pile Driver (sonic)	upper range	0,734	105
	typical	0,170	93
Clam shovel drop (slurry wall)		0,202	94
Hydromil (slurryl wall)	in soil	0,008	66
	in rock	0,017	75
Vibratory		0,210	94
Hoe Ram		0,089	87
Large bulldozer		0,089	87
Caisson drillin		0,089	87
***Loaded trucks**		**0,076**	**86**
Jackhammer		0,035	79
Small bulldozer		0,003	58
RMS velocity in decibels (VdB RE 1 micro-inch/second)			

*Loaded truck activities are accepted as a reference vibration.

Reference vibration levels for several generic construction equipment is listed in Table 9.23. The one which has the highest vibration reference value and will be operative during construction works is the "loaded trucks". To be on the safe side and represent a worst case scenario vibration calculations are conducted with "loaded truck" reference value. The peak

particle velocities at the identified receivers are calculated with reference vibration velocities and distances in between the working area and receiving bodies as shown in the equation below.

Equation 1 Peak Particle Velocity at Receiver - Formula

$$PPVreceiver = PPVreferance \times (dref/drec)^{1.5}$$

PPV: peak particle velocity (mm/s),

dref: reference distance (m),

drec: receiver distance (m)

Equation 2 Peak Particle Velocity for Blasting - Formula

$$PPV = \mathrm{k} \times (\mathrm{SD})^{-\beta}$$

PPV: peak particle velocity (mm/s),

k: propagation coefficient

SD: scaled distance (m)

β: extinction coefficient

Equation 3 SD - Formula

$$\mathrm{SD} = \mathrm{D}/\sqrt{w}$$

D: distance from blasting point to assessment point (m)

W: amount of explosive material (kg)

9.4.2 Results and Assessment

This section presents the noise modelling findings together with grid noise maps as well as the computed vibration levels. The procedures described in Section 9.2.3 are used to obtain the impact scales, magnitudes, and final significances.

9.4.2.1 Noise

Construction Noise

The potential noise impacts caused by construction activity are evaluated with the model and noise maps were prepared.

The construction noise maps are presented in Figure 9.5.

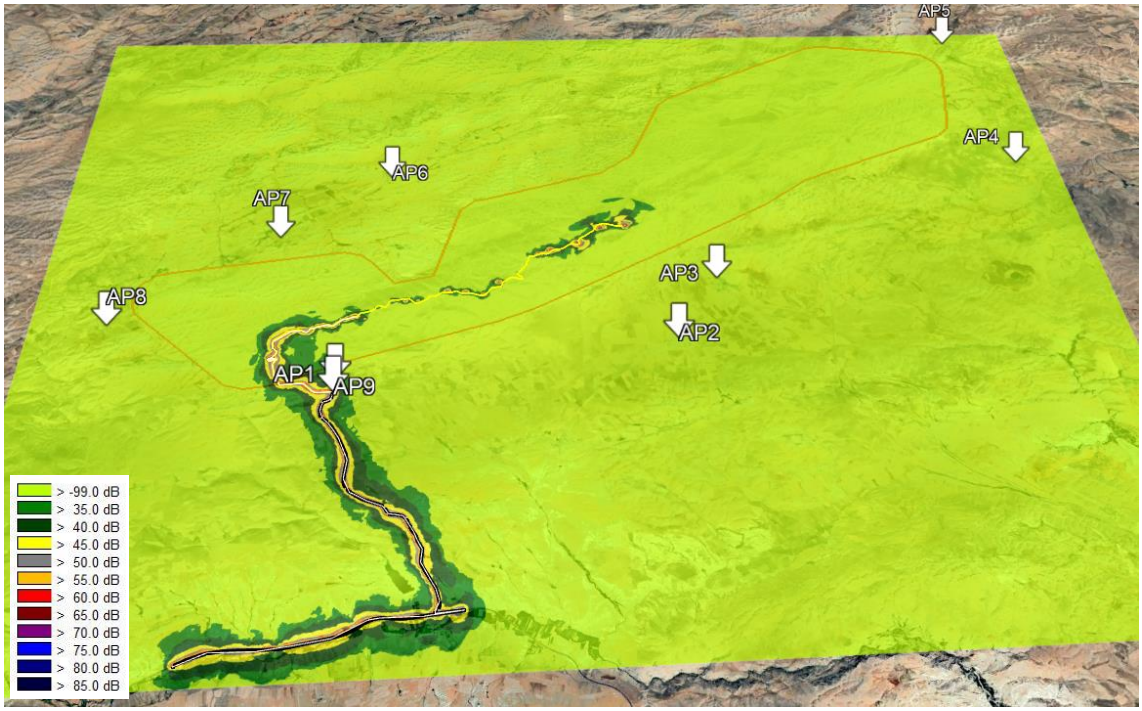


Figure 9.5: Construction Noise Map – Day, dBA

Construction phase noise assessments are presented in Table 9.23 for IFC General EHS Guideline Limits.

Table 9.23 Construction Phase Noise Assessment Results, IFC-WBG Limits

Assessment Point	Model Result L_{eq} (dBA)	Baseline L_{eq}	Cumulative	Limit Value	Limits Exceedance (dBA)	Scale of Impact	Impact Magnitude	Impact Significance
	L_d	L_d	L_d	L_d				
1	35.8	44.4	45.0	55.0	0.0	No Impact	No Impact	No Impact
2	Undetected	43.0	43.0	55.0	0.0	No Impact	No Impact	No Impact
3	Undetected	43.0	43.0	55.0	0.0	No Impact	No Impact	No Impact
4	Undetected	43.0	43.0	55.0	0.0	No Impact	No Impact	No Impact
5	Undetected	43.0	43.0	55.0	0.0	No Impact	No Impact	No Impact
6	Undetected	44.4	44.4	55.0	0.0	No Impact	No Impact	No Impact
7	Undetected	44.4	44.4	55.0	0.0	No Impact	No Impact	No Impact
8	Undetected	44.4	44.4	55.0	0.0	No Impact	No Impact	No Impact
9	65.5	44.4	65.5	55.0	10.5	VL	L	Major

*Undetected: No impact was detected at the assessment point.

No Impact	**8**
Negligible	**0**
Minor	**0**
Moderate	**0**
Major	**1**

As can be seen from the assessment table related with the construction phase of the Project; “No Impact” final impact significances are observed for all receiver locations except AP9 which is concluded with “Major” final impact significance.

Operation Noise

The potential noise impacts caused by operation activity are evaluated with the model and noise maps were prepared.

The operation noise maps are presented in Figure 9.6 and Figure 9.7. Operation phase noise assessments are presented in Table 9.24 for RENC Limits and Table 9.25 for IFC Limits.

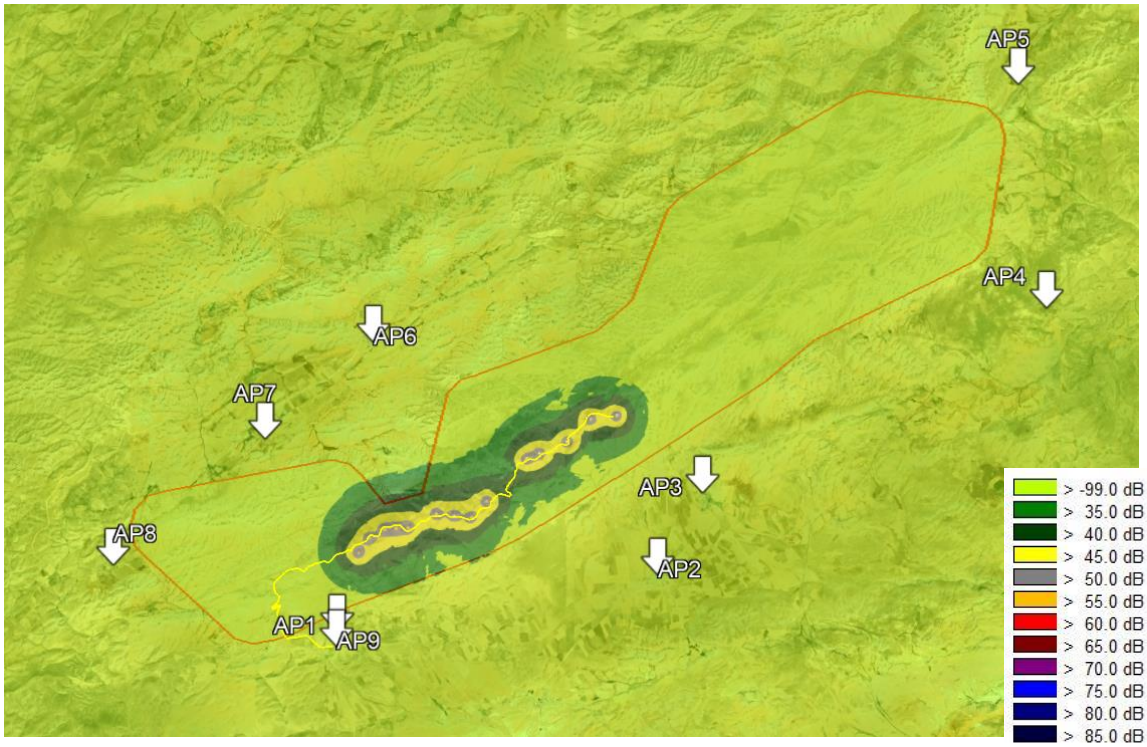


Figure 9.6 Operation Noise Map – Day, dBA

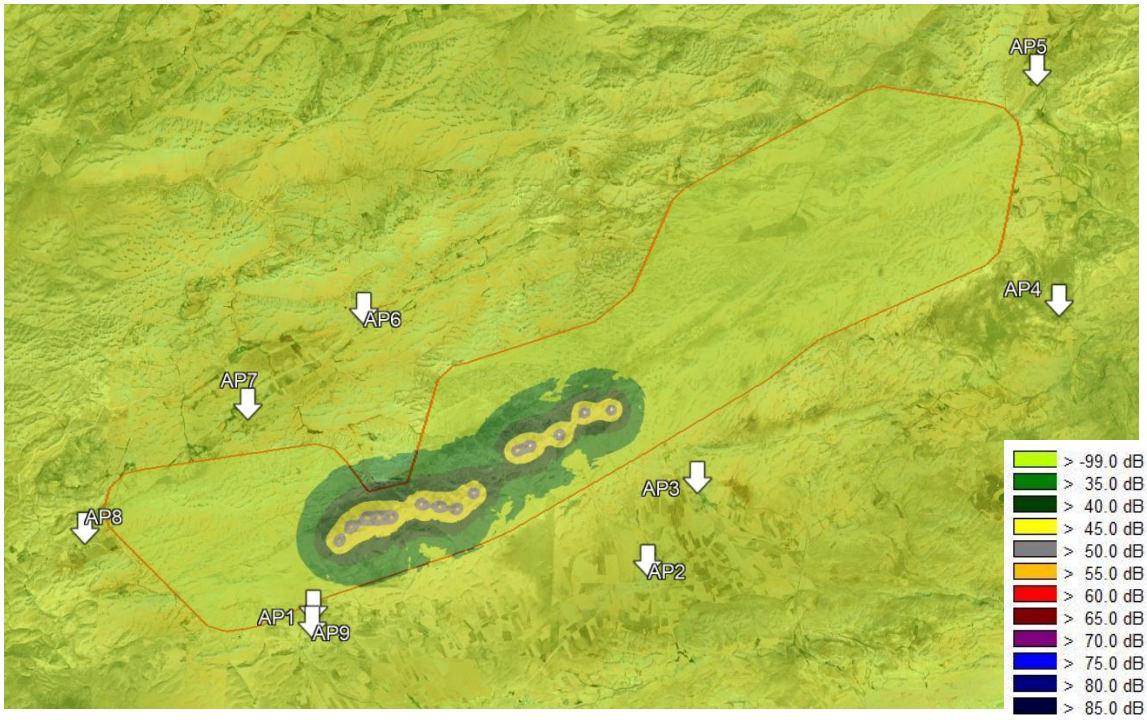


Figure 9.7 Operation Noise Map – Night, dBA

Table 9.24: Operation Phase Noise Assessment Results, RENC Limits

Assessment Point	Model Result L_{eq} (dBA)			Limit Value L_{eq} (dBA)			Limit Exceedance	Scale of Impact	Impact Magnitude	Impact Significance
	L_{day}	L_{eve}	L_{night}	L_{day}	L_{eve}	L_{night}	Max (dBA)			
1	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
2	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
3	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
4	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
5	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
6	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
7	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
8	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact
9	Undetected	Undetected	Undetected	65,0	60,0	55,0	0,0	No Impact	No Impact	No Impact

*Undetected: No impact was detected at the assessment point.

No Impact	**9**
Negligible	**0**
Minor	**0**
Moderate	**0**
Major	**0**

Table 9.25: Operation Phase Noise Assessment Results, IFC-WBG Limits

Assessment Point	Model Result L_{eq} (dBA)		Baseline L_{eq} (dBA)		Cumulative (dBA)		Limit Value (dBA)		Limits Exceedance Max	Scale of Impact	Impact Magnitude	Impact Significance
	L_d	L_n	L_d	L_n	L_d	L_n	L_d	L_n				
1	Undetected	Undetected	44.4	39.6	44.4	39.6	55,0	45,0	0,0	No Impact	No Impact	No Impact
2	Undetected	Undetected	43.0	38.2	43.0	38.2	55,0	45,0	0,0	No Impact	No Impact	No Impact
3	Undetected	Undetected	43.0	38.2	43.0	38.2	55,0	45,0	0,0	No Impact	No Impact	No Impact
4	Undetected	Undetected	43.0	38.2	43.0	38.2	55,0	45,0	0,0	No Impact	No Impact	No Impact
5	Undetected	Undetected	43.0	38.2	43.0	38.2	55,0	45,0	0,0	No Impact	No Impact	No Impact
6	Undetected	Undetected	44.4	39.6	44.4	39.6	55,0	45,0	0,0	No Impact	No Impact	No Impact
7	Undetected	Undetected	44.4	39.6	44.4	39.6	55,0	45,0	0,0	No Impact	No Impact	No Impact
8	Undetected	Undetected	44.4	39.6	44.4	39.6	55,0	45,0	0,0	No Impact	No Impact	No Impact
9	Undetected	Undetected	44.4	39.6	44.4	39.6	55,0	45,0	0,0	No Impact	No Impact	No Impact

*Undetected: No impact was detected at the assessment point.

No Impact	**9**
Negligible	**0**
Minor	**0**
Moderate	**0**
Major	**0**

As can be seen from assessment tables related with the operation phase of the Project; all final impact significances were found to result in “No Impact” in accordance with both national and IFC limits for 14 receiver locations.

9.4.2.2 Vibration

Construction and Blasting Vibration

The major vibrational activity is loaded truck and blasting activities for the construction phase.

The reference vibration value is accepted as loaded truck according to the FTA. The construction vibration levels related to distance were calculated according to the Equation 1, Equation 2 and Equation 3.

Construction vibration levels and limit values are presented in Figure 9.8.

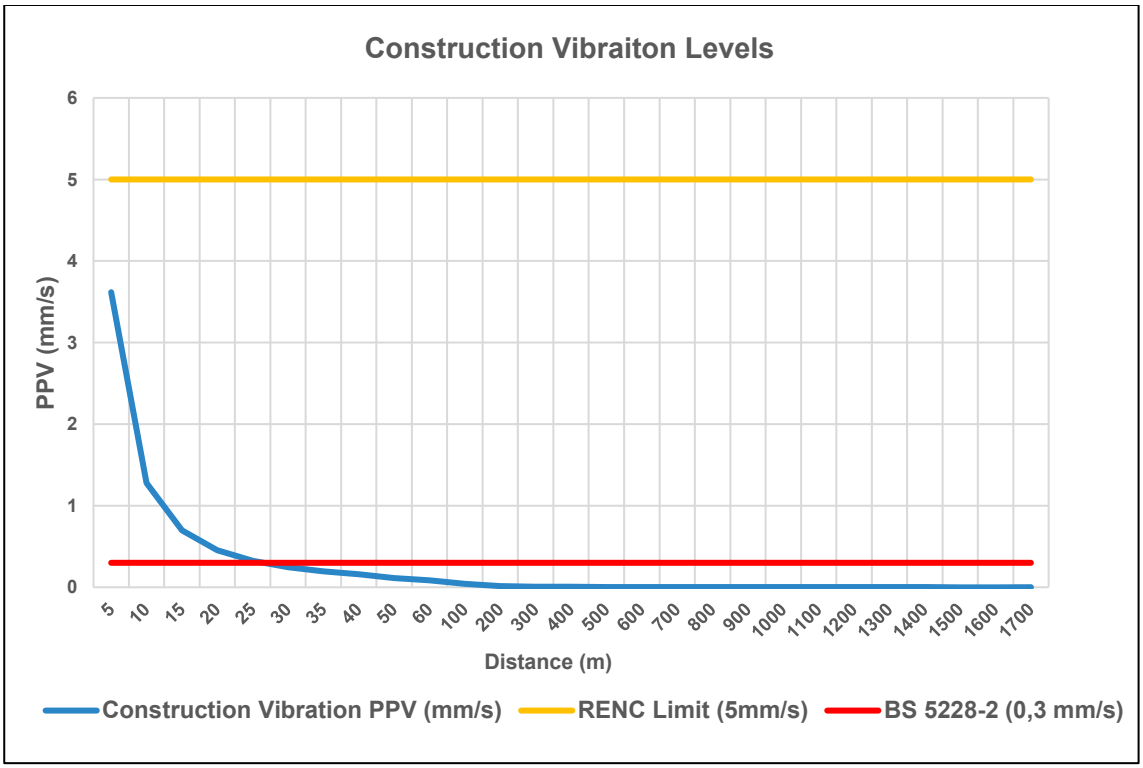


Figure 9.8: Construction Vibration Levels and Limit Values

Critical distances from the construction zone are calculated as 30 meters according to the BS 5225-2:2009 document. As can be seen from Figure 9.8, construction activity closer than the critical distances to the receiving bodies, may cause vibrational impact.

Calculated construction vibration levels at the assessment points are presented in Table 9.26.

Table 9.26: Construction Vibration Results

Assessment Points	Construction Vibration Level (mm/s)	Distance (m)	Critical Distance (m)	
			RENC	BS5228-2
1	0.006	353	<5	<30
2	0.000	4280	<5	<30
3	0.000	3110	<5	<30
4	0.000	11897	<5	<30
5	0.000	14000	<5	<30
6	0.000	5000	<5	<30
7	0.000	3785	<5	<30
8	0.000	4222	<5	<30
9	3.632	5	<5	<30

The construction vibration impact assessment results are presented in Table 9.27.

Table 9.27: Construction Vibration Impact Assessment Results

Assessment Point	Distance (m)	Vibration ppv (mm/s)	Limit Values (mm/s)		Limits Exceedance (max)	Scale of Impact	Impact Magnitude	Impact Significance
			RENC	BS 5228-2:2009				
1	353	0.006	5,000	0,300	0,0	No Impact	No Impact	No Impact
2	4280	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
3	3110	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
4	11897	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
5	14000	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
6	5000	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
7	3785	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
8	4222	0.000	5,000	0,300	0,0	No Impact	No Impact	No Impact
9	5	3.632	5,000	0,300	3.3	Moderate	Moderate	Moderate

No Impact	**8**
Negligible	**-**
Minor	**-**
Moderate	**1**
Major	**-**

As can be seen from Table 9.27, there is one “Moderate”, and eight “No Impact” final impact significance measurement results in accordance with BS 5228-2:2009 regarding the vibration due to construction phase.

Blasting activities are also assessed and results are presented below.

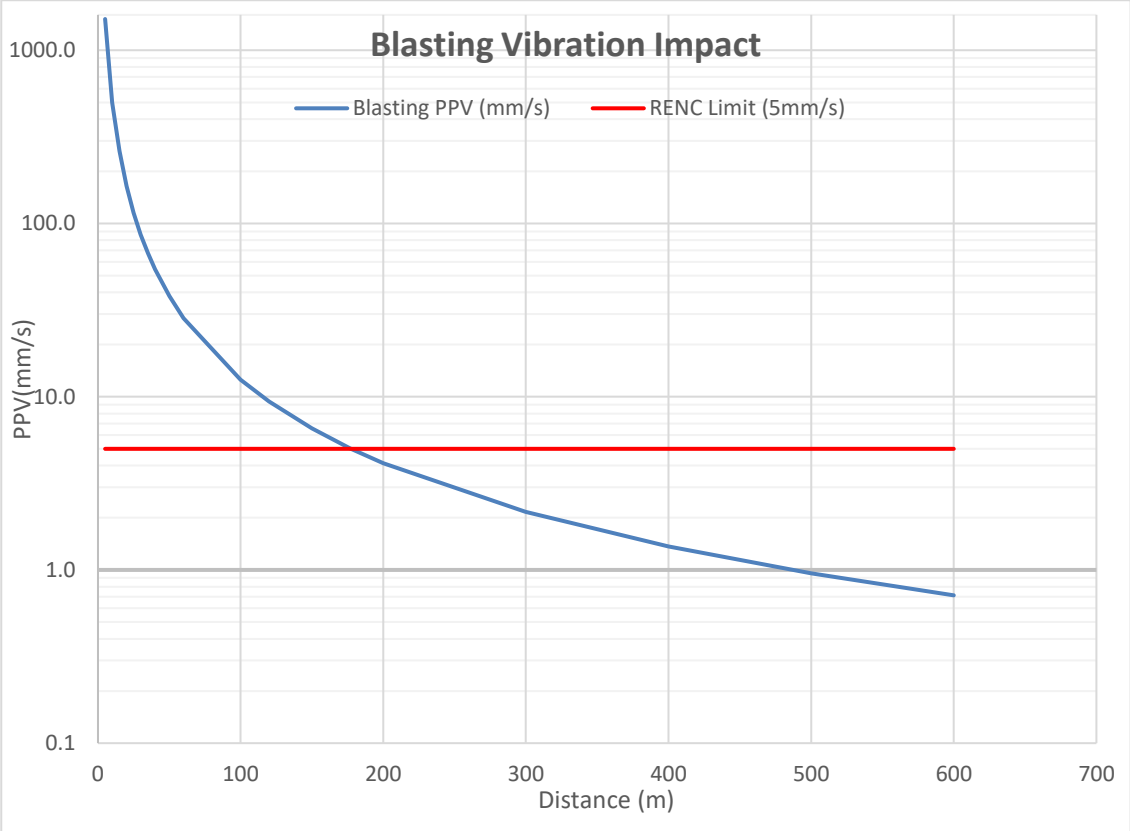


Figure 9.9: Blasting Vibration Level and Limits

Critical distances from the blasting zone are calculated as 177 meters according to the RENC limits. As can be seen from Table 9.28, blasting activity closer than the critical distances to the receiving bodies, may cause the vibrational impact.

Table 9.28: Construction Vibration Results

Assessment Points	Distance (m)	Critical Distance (m)
		RENC
1	3600	177
2	6650	177
3	7700	177
4	17900	177
5	20000	177
6	4800	177
7	4700	177
8	8300	177
9	3950	177

The blasting vibration impact assessment results are presented in Table **9.29**.

Table 9.29: Blasting Vibration Impact Assessment Results

Assessment Point	Distance (m)	Vibration ppv (mm/s)	Limit Values (mm/s)	Limits Exceedance	Scale of Impact	Impact Magnitude	Impact Significance
1	3600	0.041	5.0	0.0	No Impact	No Impact	No Impact
2	6650	0.015	5.0	0.0	No Impact	No Impact	No Impact
3	7700	0.012	5.0	0.0	No Impact	No Impact	No Impact
4	17900	0.003	5.0	0.0	No Impact	No Impact	No Impact
5	20000	0.003	5.0	0.0	No Impact	No Impact	No Impact
6	4800	0.026	5.0	0.0	No Impact	No Impact	No Impact
7	4700	0.026	5.0	0.0	No Impact	No Impact	No Impact
8	8300	0.011	5.0	0.0	No Impact	No Impact	No Impact
9	3950	0.035	5.0	0.0	No Impact	No Impact	No Impact
						No Impact	**9**
						Negligible	**-**
						Minor	**-**
						Moderate	**-**
						Major	**-**

Operational Vibration

There is no vibration impact is expected for operation phase of the project.

9.5 Impact Mitigation & Residual Impact

9.5.1 Construction

Assessment Point 9 found out to have moderate and major final impact significances in terms of construction vibration and noise. However, detected impacts include a great extent of uncertainty. The impacts are sourced from construction truck passages.

The Project will seek compliance with international guidelines and national legislation regarding prevention and control of noise and vibrations during construction. Following measures could be taken to mitigate any impact.

- Earth-moving and noisy equipment will be kept as far away from sensitive areas as feasible on the construction site.
- Activities that cause noise and vibration will be spread over time as much as possible so that multiple activities that generate noise and vibration do not occur at the same time and their cumulative impacts are mitigated.
- Baseline noise levels will be taken into account when construction activities are planned. At low baseline noise regions, hours and at the weekends, truck activities will be limited as much as possible and low noise generating activities will be scheduled.
- Construction impacts detected are directly related with truck routes. Truck access routes can be altered at impacted zones.
- Site-specific measures could be implemented. (i.e. extra speed limits at impacted zones).
- Construction workers will be trained on relevant management plans and be aware of the sensitive nature of workplaces they are operating in and advised to limit verbal noise or other forms of noise.
- Noise and vibration will be minimized at the Project area and surrounding areas through instructing construction truck drivers to switch off vehicle engines while offloading materials and to shut down or throttled down to a minimum when not in operation.
- Local communities will be engaged to minimize any disturbance and effect on the safety, health of people in the nearby buildings.
- Complaints on noise and vibration disturbances will be recorded, assessed and necessary preventive measures will be taken.

Noisy activities taking place within construction sites will be located away from the residential areas to the extent possible.

Perceptible, vibration levels are detected solely from truck passages at the settlement located very close to the site access roads.

Any possible structural damages or deviations need to be monitored and any possible complaint need to be collected regularly.

No residual impacts are expected.

9.5.2 Operation

In terms of both operational noise and vibration there is no significant impact detected at any of the assessment points. Thus, there is no need for any kind of mitigation measures and no residual impacts expected in terms of operation phase.

10 Landscape and Visual

10.1 Introduction

This report contains the visual impacts that would be caused during the operation phase of the Project. Modelling studies were undertaken to analyse shadow flicker impact and zones of turbine visibility. All wind turbines within the scope of Project have been considered.

The anticipated activities at each receiver are modelled using the WindPRO 4.0 software.

Shadow impacts were assessed in line with “IFC Environmental, EHS Guidelines for Wind Energy” document.

10.2 Methodology

10.2.1 Applicable Guidelines and Standards

In this section, international guidelines and applicable standards for the shadow flicker assessment are described.

Environmental, health, and safety guidelines for Wind Energy document published by IFC denotes following;

39. If it is not possible to locate the wind energy facility/turbines such that neighbouring receptors experience no shadow flicker effects, it is recommended that the predicted duration of shadow flicker effects experienced at a sensitive receptor not exceed 30 hours per year and 30 minutes per day on the worst affected day, based on a worst-case scenario.

Even though many of the countries around world do not have any regulation or limitations about Shadow Flicker concept, the ones that worked on it have limitations and regulations likewise.

Below Table 10.1 summarizes applicable project limits.

Table 10.1: IFC Wind Energy Guideline Shadow Flicker Limits

Receptor	Yearly Flicker Occurrence (hr/year)	Daily Flicker Occurrence (min/day)
Turbine neighbouring sensitive areas	30	30

10.2.2 Study Area and Area of Influence

The Project’s AoI for the shadow flicker impact was determined as the area where shadow generated by the Project reaches out the receptors. As such, the AoI for the shadow impact was determined as sensitive residential areas located at nearest settlements.

10.2.3 Impact Assessment Methodology

In terms of shadow flicker and visual impacts, methods to classify impact is defined in this section.

10.2.3.1 Shadow Flicker

For shadow flicker given limits in Table 10.1 will be determinant to classify the impact. If the limits defined;

- Is exceeded than it could be said that “Moderate to Major” impact can be expected.
- Is not exceeded however some shadow flicker occurrence present than it could be said that “Negligible to Minor” impact can be expected.
- Is not exceeded moreover no shadow flicker occurrence present than it could be said that “No Impact” is expected.

10.2.3.2 Visual Impact

In terms of visual impacts if any of the following terms is fulfilled;

- Landscape of the receptor is completely changed after introduction of the turbines,
- Landscape of the receptor is blocked after introduction of the turbines,
- Multiple turbines are visible closer than 100 meters,
- More than 10 visible turbines agglomerated within a 500 meters radius,

Final impact significance can be determined as “Moderate”.

Unless any of the articles fulfilled final impact significance can be determined as “Negligible/Minor”. Since, any potential impact from turbines in terms of landscape solely visual and no critical or hazardous impact is expected visually, in any case “Major” impact significance is not expected.

10.2.4 Modelling Methodology and Related Definitions

Modelling and calculation details about calculations will be shared at this section of the report.

10.2.4.1 Shadow Flicker

Shadow flicker occurs on a dwelling when the wind turbine rotor is directly between the line of sight of the sun rays and the windows of the dwelling. More precisely, this phenomenon appears once the blades are rotating, which creates an intermittent light reduction.

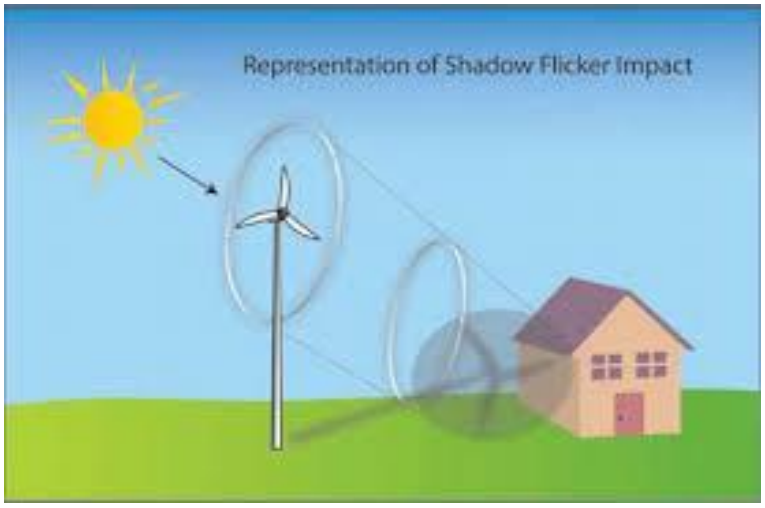


Figure 10.1: Shadow Flicker Representation

The impact of shadow flicker can differ through same day since the sun height is low during sunrise and sunset and higher the rest of the day. That’s why shadow flicker is observed only during specific and short periods. For similar reasons, the impact from shadow flicker differs throughout the year.

Although an unlikely case, it's standard practice to evaluate the shadow flicker in a "worst-case" scenario. The worst case scenario considers that:

- The sun is shining all day with no disturbance from clouds or fog;
- The sun rays, the turbine rotor and the windows are in the same line-of-sight all day long;
- The wind is blowing all day, which means that wind turbines are always operating;
- The dwelling is composed only of windows (like a greenhouse);
- There is no light obstruction from obstacles (existing turbines, trees, other buildings, etc.);
- There is no light obstruction from topography;

Moreover, the shadow flicker intensity is not considered. Thus, even if the shadow is too weak to be observable, the period of flicker will be recorded.

The results of the "worst-case" scenario is presented in this analysis, but needs to be considered as information only since, as discussed previously, it represents a situation which is not possible in reality.

In order to gather more realistic results, real case scenario is also considered and simulated during project. Following sub-topics explains important aspects needed in order to create a real case scenario.

10.2.4.2 Flicker Occurrence

The occurrence of the shadow flicker can be altered by the following factors:

- The sunshine/cloudiness data of the project region
- The wind data of the project region, allowing to consider the real direction of the turbine rotor and the period when the turbine doesn't rotate
- The presence of obstacles like existing wind turbines, trees or buildings
- The topography of the site which could create a natural shadow
- The external configuration of the dwellings (direction of building faces, number and size of the windows)
- The internal configuration of the dwellings (size and location of the rooms)
- The physical obstacles inside the dwellings (curtains, blinds…)

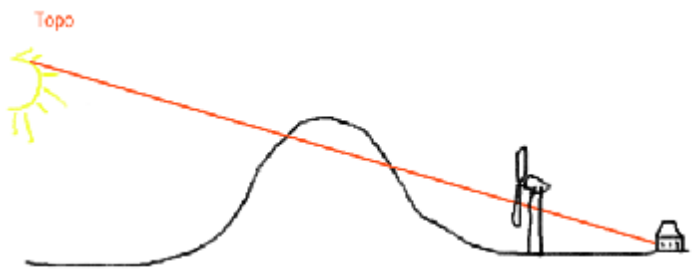


Figure 10.2: Topographic Shadow

10.2.4.3 Visual Impacts, Zones of Visibility (ZVI)

Visual impact study can be defined as modelling future appearance of the turbines from determined receivers. Below Figure 10.3 represents the visual impact created by turbines at different distances to the receiver locations.

Figure 10.3: Visual Impacts of Turbines of Different Distances

In order to complete this study during project, the visibility of each turbine is calculated and mapped for identified receivers.

10.2.4.4 Turbine Information

Information related to the turbines to be used in the project are presented in the below Table 10.2.

Table 10.2: Planned Turbine Specifications

Turbine	Nominal Power (kW)	Hub Height (m)	Sound Power Level (dBA)
T1-T14	5900	108	106,4

10.2.4.5 Modelled Factors

There are a number of attenuation factors that can potentially be used in the assessment of shadow flicker, however only several of these factors have been included in this study. Topographic obstacles are modelled. Moreover, total annual working time of the turbines is another modelling criterion. Because of the fact that cut-in speed of the turbines is low, it is assumed that turbines will work all year long.

The factors which cannot be modelled in this study such as internal obstacles of the dwellings all in favour of lowering the shadow flicker exposure.

Since limit values guided by IFC is worst-case scenario limits, modelling studies conducted according to a worst-case scenario.

The attenuation factors used in this study are:

- The sunshine/cloudiness data of the project region;
- The topography of the site.

10.3 Baseline Conditions

During field trips and spatial surveys landscape identification conducted for current situation around planned facility site. In terms of current landscape followings are noted;

- The field is mostly consists of rural and forest villages.
- The terrain is mostly forests and rocky mountainous areas.

- As a consequence of the hilly terrain, very close distances can be shadowed by terrain fluctuations.

10.3.1 Identified Receptors

Identified receptors are defined for the assessment of Shadow Flicker effect. The details of identified receptors with the representative measurement points are presented in Table 10.3 and Figure 10.4 shows the locations identified receivers.

Table 10.3: Identified Receptors (Assessment Points)

Assessment Points	Comments	Extent	Sensitivity	Importance
AP 1	Residential	Local	Medium	Medium
AP 2	Residential	Local	Medium	Medium
AP 3	Residential	Local	Medium	Medium
AP 4	Residential	Local	Medium	Medium
AP 5	Residential	Local	Medium	Medium
AP 6	Residential	Local	Medium	Medium
AP 7	Residential	Local	Medium	Medium
AP 8	Residential	Site	Medium	Medium
AP 9	Residential	Local	Medium	Medium

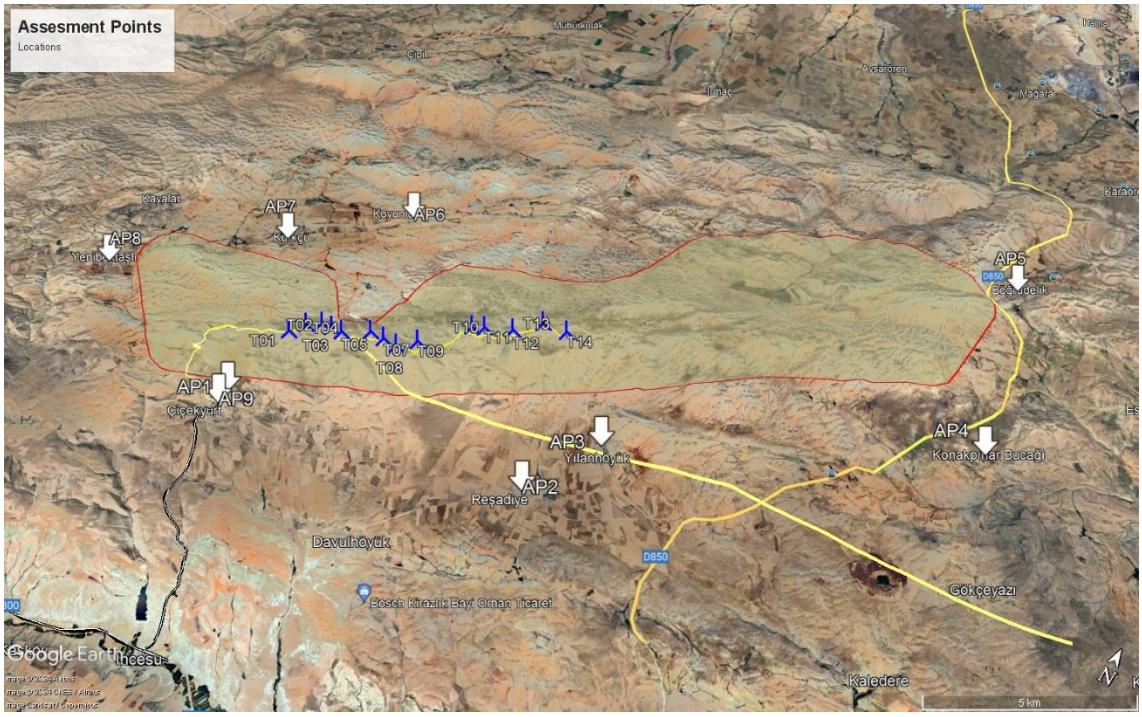


Figure 10.4: Identified Receptors

10.4 Impact Assessment

Limiting values guided by World Bank Group IFC in terms of shadow flicker are defined according to a worst-case scenario. However; as stated in the methodology part of this Chapter,

assumptions of worst-case scenario is very unlikely to occur. Accordingly, following studies are conducted;

- Shadow flicker point calculations, worst-case.
- Shadow flicker maps, real case.
- Zones of visibility maps and results

10.4.1 Shadow Flicker

Below Figure 10.5 shows the shadow flicker occurrence periods according to a real case scenario.

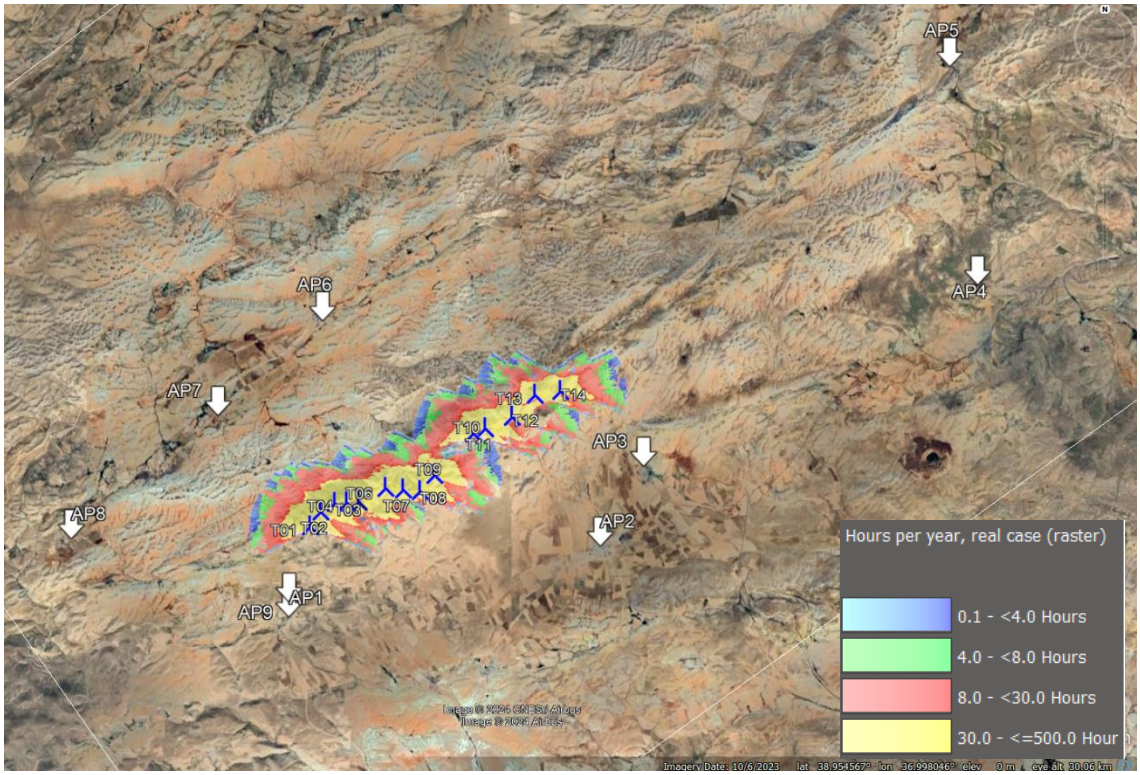


Figure 10.5: Shadow Flicker Occurrence Map, Real Case, Hours per Year

Below Table 10.4 shows point calculation results and assessment for shadow flicker according to worst case scenario. Accordingly, at any assessment points shadow flicker impact is not foreseen.

Table 10.4: Shadow Flicker Results and Assessment

Assessment Point	Worst-case hours per year	Limit, Hours	Worst affected day hours per day	Limit, Minutes	Impact
1	00:00	30:00	00:00	00:30	No Impact
2	00:00	30:00	00:00	00:30	No Impact
3	00:00	30:00	00:00	00:30	No Impact
4	00:00	30:00	00:00	00:30	No Impact
5	00:00	30:00	00:00	00:30	No Impact
6	00:00	30:00	00:00	00:30	No Impact

Assessment Point	Worst-case hours per year	Limit, Hours	Worst affected day hours per day	Limit, Minutes	Impact
7	00:00	30:00	00:00	00:30	No Impact
8	00:00	30:00	00:00	00:30	No Impact
9	00:00	30:00	00:00	00:30	No Impact
13	00:00	30:00	00:00	00:30	No Impact
14	00:00	30:00	00:00	00:30	No Impact

10.4.2 Zones of Visibility (ZVI)

Below Figure 10.6 shows turbine visibility assessment.

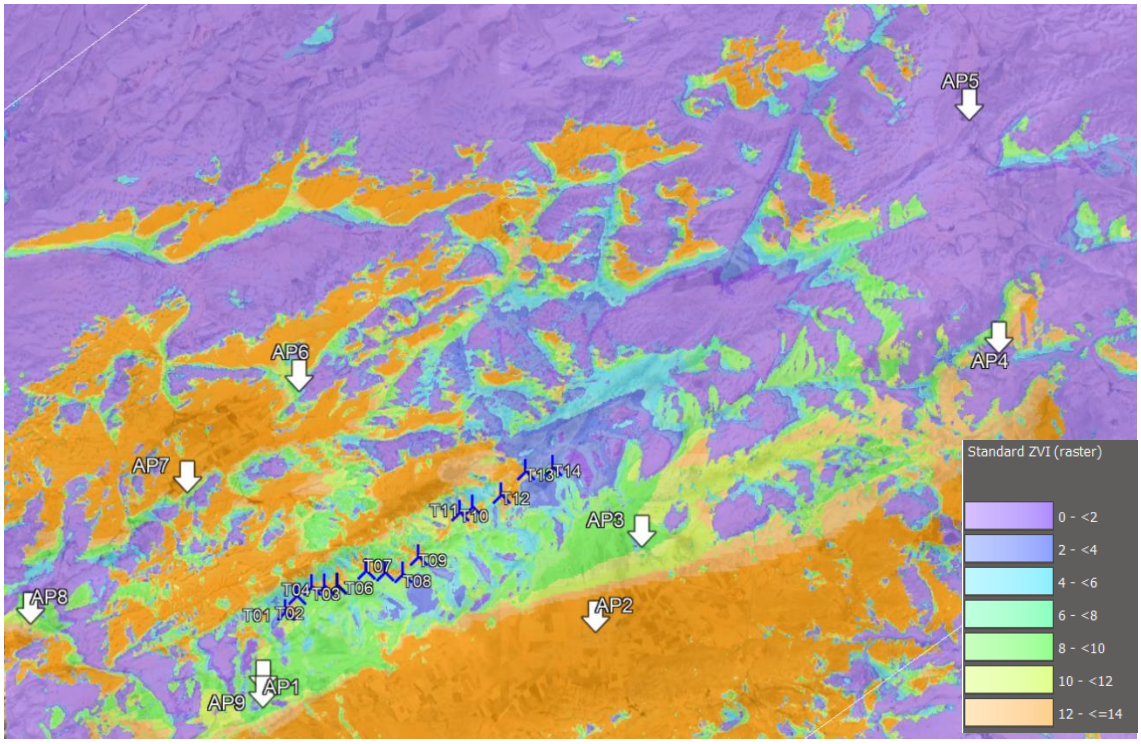


Figure 10.6: Turbine Visibility Map, (0=No visible turbine, 1-28=number of turbines visible)

Below Table 10.5 shows the visible turbine quantities for each receptor.

Table 10.5: Turbine Visibility and Impact Assessment

Assessment Point	Number of Visible Turbines	Final Impact
1	6-8	Negligible/Minor
2	12-14	Negligible/Minor
3	8-10	Negligible/Minor
4	0-2	Negligible/Minor
5	0-2	Negligible/Minor
6	8-10	Negligible/Minor
7	10-12	Negligible/Minor

Assessment Point	Number of Visible Turbines	Final Impact
8	8-10	Negligible/Minor
9	6-8	Negligible/Minor

Theoretical relative visibility of the turbines from identified receivers are rendered on satellite images and presented in Figure 10.7 – Figure 10.13.

As a matter of fact, that turbines located at a very close distance to the rural households (considering average height of the rural houses and average height of the turbines), surely can have at least psychological adverse effects on habitants. Nonetheless, considering turbine distances to the households (being very distant), visual impact is expected to be only slightly changing the view of the residents.

Figure 10.7: Turbine Visibility at Assessment Point 1-9

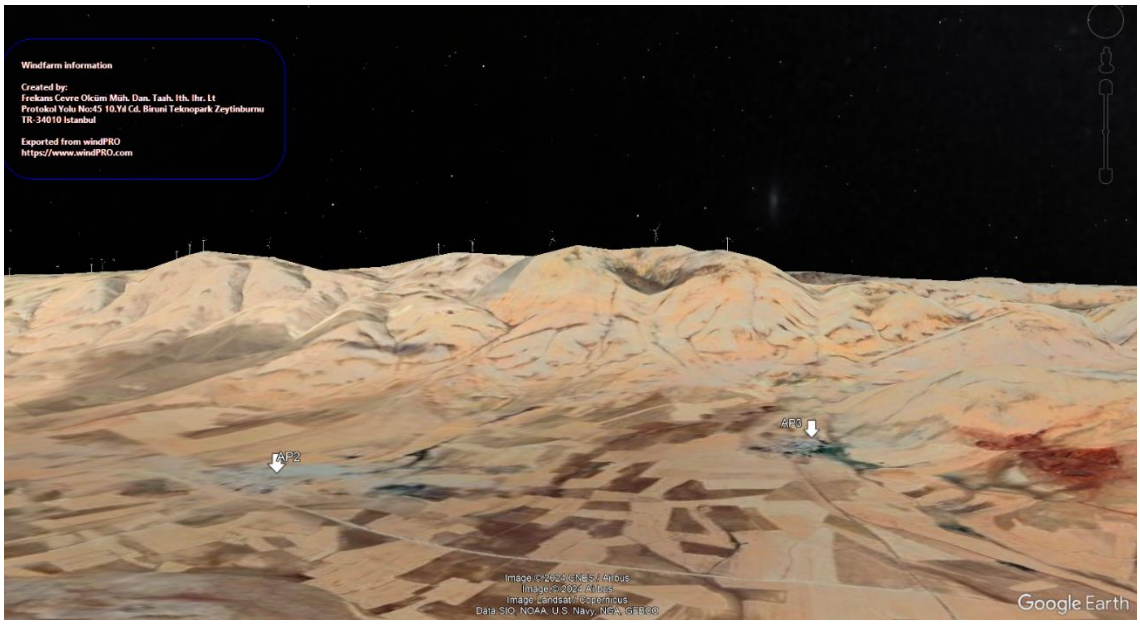


Figure 10.8: Turbine Visibility at Assessment Point 2-3

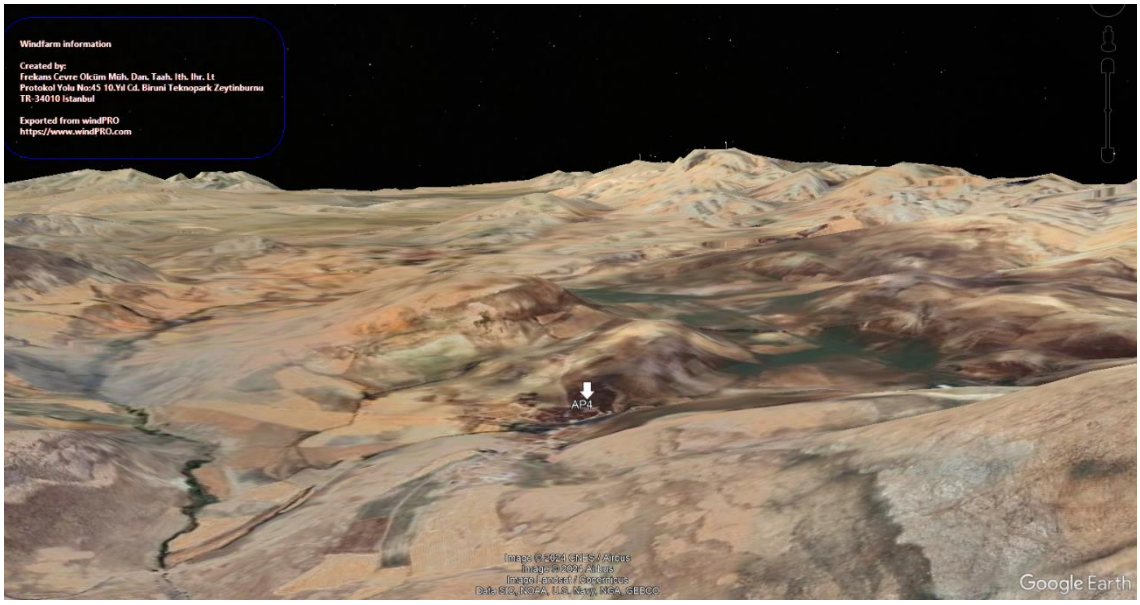


Figure 10.9: Turbine Visibility at Assessment Point 4

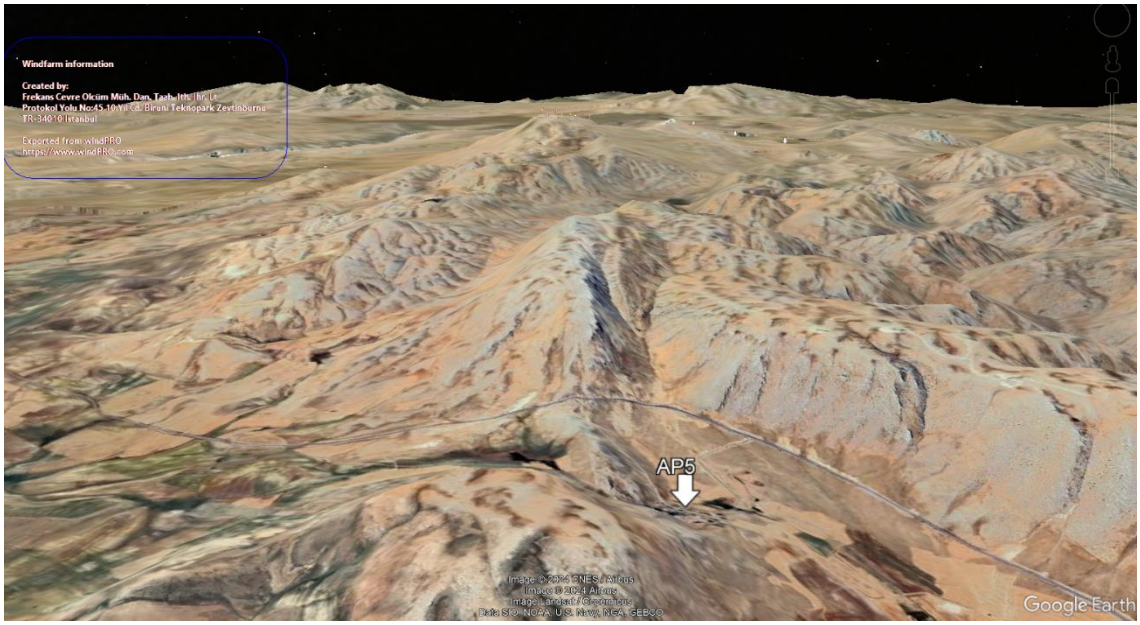


Figure 10.10: Turbine Visibility at Assessment Point 5

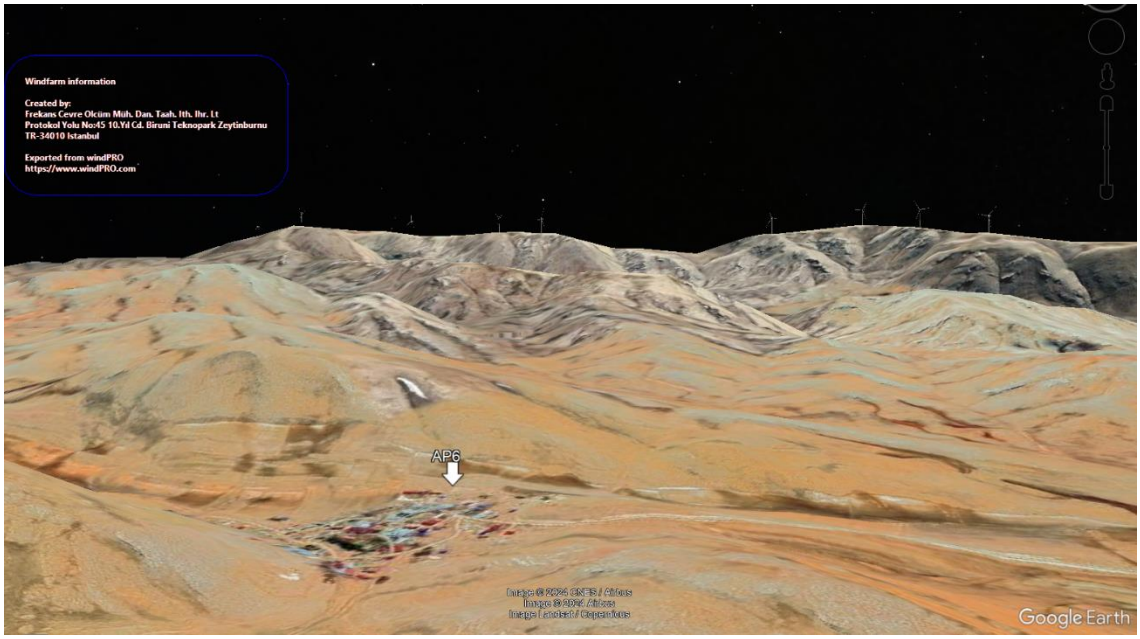


Figure 10.11: Turbine Visibility at Assessment Point 6

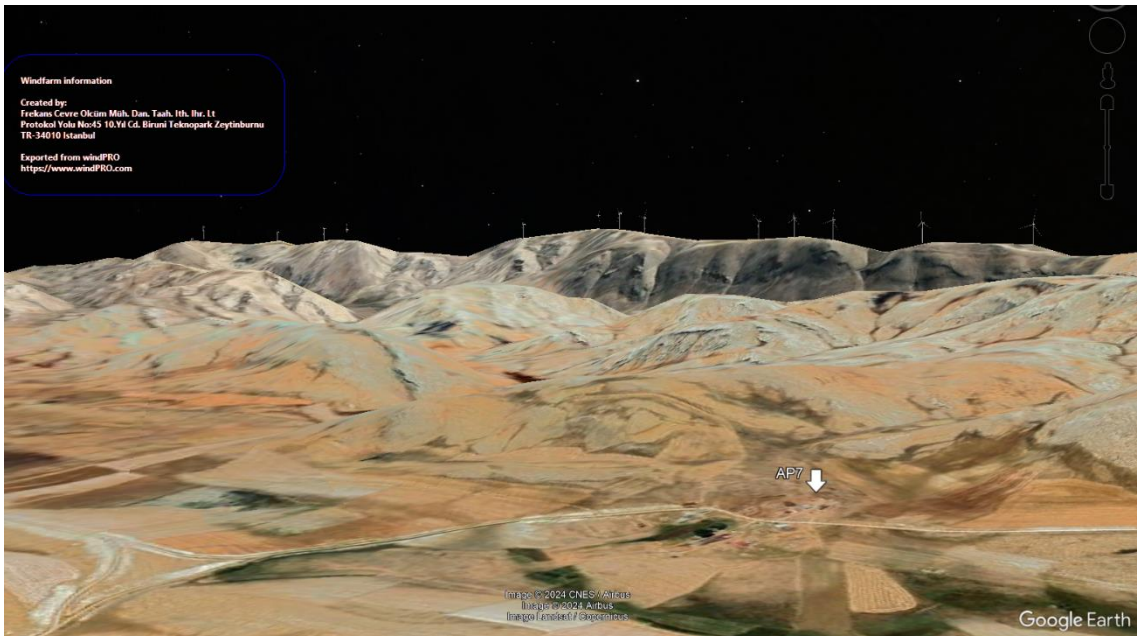


Figure 10.12: Turbine Visibility at Assessment Point 7

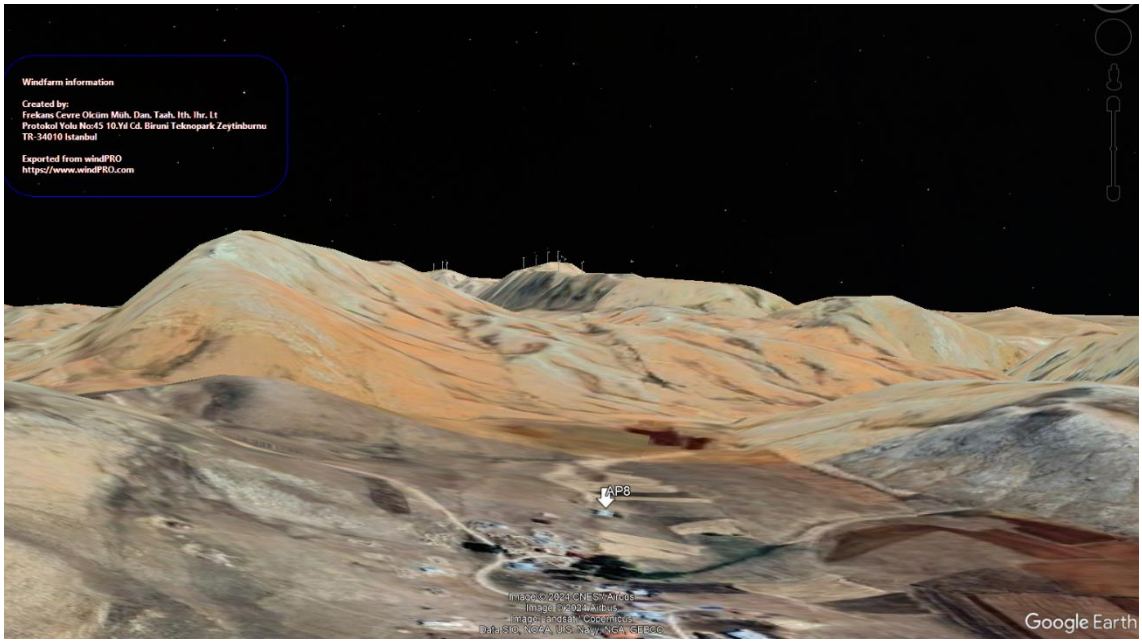


Figure 10.13: Turbine Visibility at Assessment Point 8

10.5 Mitigation Measures and Residual Impacts

In terms of shadow flicker, and visual impact negligible/minor impact detected at most at identified receptors. Thus, no mitigation measures are considered.

11 Waste and Resources

11.1 Introduction

The potential impacts from the use of material resources and waste generation during construction and operation phases of the Project in line with national, international and the Lenders' guidelines, policy and standards are discussed in this Chapter. A description of the material resources that will be required for the construction and operation of the Project and the baseline conditions for the waste and wastewater management have been identified. In addition, management of waste which are anticipated to be generated during construction and operation phases are shared. In terms of waste management, potential impacts include environmental impacts, health and safety impacts to the workers and employees and impacts to the community resulting from the improper waste management during construction and operation phases.

11.2 Methodology

11.2.1 Applicable Guidelines and Standards

Beside detailed regulation, guideline and standards framework shared in *Chapter 3: Policy, Legal and Institutional Framework*, each chapter presents topic-based policy and legislations. In this chapter, waste and resource related policy and legislations are shared.

11.2.1.1 National Requirements

National policy and legislation in Türkiye related to waste and resources management that are applicable to the Project is shown in Table 11.1.

Table 11.1: National Policy and Legislation Relating to Waste and Resource

Law/Regulation	Official Gazette (OG) Date	OG Number
Environmental Law (2872)	11.08.1983	18132
Regulation on Environmental Impact Assessment	29.07.2022	31907
Regulation on Environmental Permit and License	10.09.2014	29115
Regulation on Environmental Audit	12.06.2021	31509
Regulation on Waste Management	02.04.2015	29314
Regulation on Zero Waste	12.07.2019	30829
Regulation on Soil Pollution Control and Point-Source Contaminated Sites Soil	08.06.2010	27605
Regulation on Landfill of Waste	26.03.2010	27533
Regulation on Management of Waste Oils	21.12.2019	30985
Regulation on Control of Polychlorinated Biphenyls and Polychlorinated Terphenyls	27.12.2007	26739
Regulation on Control of Packaging Waste	26.06.2021	31523
Regulation on Medical Waste Control	25.01.2017	29959
Communiqué on Road Transportation of Wastes	20.03.2015	29301
Regulation on Control of End-of-life Tires	25.11.2006	26357
Regulation on Control of End-of-Life Vehicles	30.12.2009	27448
Regulation on Control of Waste Vegetable Oils	06.06.2015	29378
Regulation on Control of the Waste Batteries and Accumulators	31.08.2004	25569

Law/Regulation	Official Gazette (OG) Date	OG Number
Regulation on Management of Waste Electrical and Electronic Appliances	26.12.2022	32055
Regulation on Control of Excavation, Construction and Demolition Waste	18.03.2004	25406
Regulation on Wastewater Collection and Disposal Systems	06.01.2017	29940
Regulation on Pits to be Constructed in Places Where Construction of Sewage Channels is Not Possible	13.03.1971	13783

Source: Republic of Türkiye Legislation Information System[98].

11.2.1.2 International Requirements

International requirements including standards, principles, guidelines, directives and principles and the Lenders' standards and guidelines related to waste and resources management applicable to the Project is shared in Table 11.2.

Table 11.2: International Requirements Relating to Waste and Resource

Requirement	Publish Date/Last Amendment Date
EU Council Directive 2008/98/EC (Waste Framework Directive) on waste and repealing certain Directives	22.11.2008
EU Council Directive 91/271/EEC concerning urban wastewater treatment (1991)	26.10.2022
Regulation (EU) 2020/741 OF European Parliament and of the Council on minimum requirements for water reuse	25.05.2020
EU Commission Directive 98/15/EC amending Council Directive 91/271/EEC with respect to certain requirements established in Annex I	1998
European Commission Environmental Impact Assessment (EIA) Guidelines	2017
EBRD Environmental and Social Policy and Performance Requirements (PR)	2019
EBRD Environmental and Social Policy	2019
IFC Performance Standards (PSs) on Environmental and Social Sustainability	2012
IFC Sustainability Framework	2012
IFC Environmental, Health and Safety Guidelines, Wastewater and Ambient Water Quality	2007
IFC Environmental, Health and Safety Guidelines, Water and Sanitation	2007
IFC Environmental, Health and Safety Guidelines, Water Conservation	2007
IFC Environmental, Health and Safety Guidelines, Waste Management	2007
IFC Environmental, Health and Safety Guidelines, Hazardous Materials Management	2007
IFC Environmental, Health and Safety Guidelines, Contaminated Land	2007
IFC Good Practice Note: Managing Contractor's Environmental and Social Performance	2017
World Bank Group, Environmental, Health, and Safety Guidelines Wind Energy	2015
World Bank Group General EHS Guidelines: Construction and Decommissioning	2007

Source: Republic of Türkiye Legislation Information System[99].

11.2.1.3 Project Standards

The Project Company commitments to comply with the national policy and legislations and Lenders' standards and guidelines applicable for waste and resources for the implementation of the Project.

[98] Accessed from https://www.mevzuat.gov.tr/, the information has been last updated as of 19 March 2024.

[99] Accessed from the relevant international institutions' websites, the information has been last updated as of 19 March 2024.

11.2.2 Area of Influence (AoI)

The AoI encompasses the Project licence area, and its scope may extend to surrounding areas where potential impacts associated with resource utilization and waste generation are assessed. Associated impacts along with their estimated magnitudes are identified within the scope of this Report. The resources or receptors to be directly impacted from the identified resource use and waste generation are also specified. Considering the extent of the AoI, the resource or receptors are including:

- Existing local infrastructure including municipality landfill and excavation disposal facilities, waste transfer stations, relevant waste recycling facilities mentioned in following sections, and wastewater treatment plants,
- Environmental aspects (e.g., soil, groundwater, air),
- The personnel employed during the construction and operation phases of the Project
- Local residents living in close proximity to the agreed waste disposal facilities and wastewater treatment plants,
- Local residents living along the routes which are used by contractors' vehicles during the transferring the material and waste from the site.

11.2.3 Study Methodology

The outcomes of the studies shared in this section is prepared based on the statements of the Project Company, the observations from the site visit conducted on 22 - 23 January 2024 and formulated projections with the baseline information.

A site visit was carried out by the Consultant on 22 - 23 January 2024 during the pre-construction phase of the Project. During the site visit, the site storage and disposal conditions planned for the construction phase were investigated together with the representatives from the Project Company and found to be compliant with national and international standards. No material storage and significant waste generation were observed during the site visit.

Information regarding the baseline waste and resources was obtained by examining the listed documentation:

- National Waste Management and Action Plan (2016- 2023), published in 2017, Ministry of Environment, Urbanization and Climate Change
- Environmental Status Reports of Sivas, 2022, Provincial Directorates of Environment, Urbanization and Climate Change
- Pelit WPP National EIA Report, 2018, En-Çev

The assessment within the AoI is carried out to identify the potential impacts on ecosystems, communities, and resources due to waste and resource management practices associated with the Project, the necessary mitigation measures are identified accordingly and shared in Section 11.4 & 11.5 and sensitivity/value and magnitude of these impacts on resource/receptors are identified in Section 11.4.3.

11.2.4 Limitations and Assumptions

The limitations and assumptions associated with the study on the waste and resources of the Project are shared below.

- The complexities of the uneven terrain make it challenging to conduct a thorough examination of the site, and the limited time available for site visit restricts the extent of baseline assessment of the entire site. Therefore, the baseline observations related to the site and the findings related to the impact of the Project on the AoI are constrained.

- Limited availability or accuracy of baseline data related with the resource use such as amount of water consumed and wastewater generated are projected on the reference data and may affect the reliability of impact assessments and the necessity of identified measures.

It is essential to acknowledge these limitations and uncertainties to provide a realistic and transparent assessment.

11.3 Baseline Conditions

This section provides an overview of the existing waste and resources management infrastructure and procedures in Sivas province and in particular for the Project area.

11.3.1 Resource Management

The construction phase activities include supplying of materials, preparing infrastructure, the assembly of the Project's components, and the ultimate disposal of construction waste. The operation phase activities include enabling electricity production continuously and disposal of operation waste. The all identified activities for the construction and operation phases of the Project demand energy and water consumption.

During the National EIA process, the official correspondences were conducted to prepare the Project area in terms of providing necessary resources needed in the construction and operation phases of the Project, and necessary resources to be provided for the Project are shared below.

Construction

- The electricity will be supplied from the national grid or diesel-fired generators to be used in the Project construction area.
- The drinking water will be supplied from dispenser size bottled water.
- The utility water will be used during the construction phase to meet the personnel needs as well as to prevent generation of dust during construction activities. The utility water will be supplied from a well which is currently used by the nearby village namely Çiçekyurt. The Project Company will ensure that the volumes required are well within the available capacity of the sources permitted to be used by the contractor. Since most of the water used will evaporate, there will be no wastewater generation due to dust suppression.
- The sanitary wastewater to be generated for the Project, will be collected in septic tanks and will be emptied by vacuum trucks to be transferred to licensed wastewater treatment plants (WWTPs) for treatment and subsequent discharge.
- During the earthworks in the construction phase of the Project; stripped topsoil is collected separately and be stored in turbine platform areas, which topsoil will be used for reinstatement purposes post-construction to re-establish green areas.
- In case the reuse of excess excavation soil is not feasible, it will be managed as excavation waste, which will be transferred and stored in the turbine areas according to zoning plan. .
- The ready-mixed concrete and aggregate will be supplied from CBP facility of the Project.

Operation

- The utility water will be used during the operation phase to meet the personnel needs. The utility water will be supplied from a well which is currently used by the nearby village namely Çiçekyurt. The Project Company will ensure that the volumes required are well within the available capacity of the sources permitted to be used.

- The wastewater to be generated will be collected in septic tank and will be emptied by vacuum trucks to be discharged to licensed WWTPs.
- The drinking water will be supplied with bottled water.
- During the maintenance and repair of the turbines within the Wind Power Plant, chemical substances are employed. The utilized chemical materials will be temporarily stored in dedicated storage areas provided with appropriate containment and then sent for disposal through licensed companies.
- The technical infrastructure needs of the Project personnel during the operation phase of the Project will be met through the planned administrative building.

11.3.2 Solid Waste Management

According to TUIK data, a total of 258,164 tonnes of municipal waste is collected in Sivas in 2022 and majority of the collected municipal waste being disposed of in sanitary landfills. The average amount of municipal waste generated in Sivas province per person is recorded as 1.42 kg/capita.day in 2022.

Currently, there is one sanitary landfill in Seyfebeli Haçin Creek Location within Sivas province. This sanitary landfill includes an energy production plant which uses landfill gas as raw material, which was established on a total area of 106.3 hectares. There is a temporary leachate collection pool in the facility and the stored leachate is disposed of by being transported to the wastewater treatment plant with a sewage truck. According to the statement of Sivas Municipality, efforts are continuing to establish a modern Dutch-style soilless glass greenhouse and produce bunch tomatoes with the energy obtained from the landfill[100].

The number and types of waste management facilities for the Sivas province are shared below based on information obtained from Environmental Status Report of Sivas and Sivas Municipality's official website (updated in 2019):

- There is one sanitary landfill in Seyfebeli Haçin Creek Location.
- There are three waste collection centers and four mobile waste collection centers in Sivas
- There are four licensed packaging waste collection and separation facilities, and there are five licensed packaging waste recycling facilities.
- There are one end-of-life vehicles (ELV) storage area.
- There are two licensed non-hazardous waste recycling facilities.
- There is one licensed medical waste sterilization facility.
- There are five licensed mine storage facilities.

The municipal solid waste collected by district municipality is disposed at waste transfer stations, and then it is taken over by municipality for proper disposal in sanitary landfill.

According to the information shared in Environment Status Reports prepared for 2022 for Sivas province excavated soils are disposed in the disposal areas. The number of disposal areas for the excavated soil are shared in Table 11.3.

[100] T.C. Enerji Kentleri Birliği, 10.09.2020 Sivas Belediyesi Çöpten Çikan Enerjiyle Topraksiz Cam Sera Kuracak, on 16 January 2024

Table 11.3: The number of excavated soil disposal areas and construction and demolition waste recycling facilities

No	• Metropolitan Municipality	• Number of Disposal Areas for the Excavated Soil	• Number of Recycling Facility for Construction and Demolition Wastes Generated
1	Sivas Municipality	6	0

According to the National Waste Management and Action Plan prepared for the period between 2016 and 2023, a municipal waste management strategy has been developed. Thus, there was no plan have been made for Sivas province. Moreover, for the year 2023, capacity expansions have been planned for municipal waste management facilities in the Aegean Region. These capacity increases are given below:

- A total capacity increase to 800 tonne per day for biological processes for separately collected municipal waste
- The establishment of a mechanical biological process facility, including a composting process, with a daily capacity of 2,420 tonne for mixed municipal waste
- The establishment of an incineration facility with a daily capacity of 1,050 tonne for mixed municipal waste.

It has been also projected that 6% of the waste generated in the Central Anatolia Region will undergo biological processing, 17% will undergo Mechanical Biological Treatment (MBT), and 7% will be subjected to thermal processes, and 65% of it is planned to be recycled and disposed of in the sanitary landfills.

All solid waste streams including hazardous wastes, are effectively managed within the district where the Project is located, utilizing existing licensed waste facilities. There is no need for trans-boundary disposal of the Project waste is required.

11.3.3 Wastewater Management

According to Sivas Environmental Status Reports for 2022, there are 5 licensed WWTPs in Sivas province.

In Sivas Municipality Wastewater Treatment Plants, the recovery method is not applied to the treated wastewater, and the treated wastewater is discharged directly to the receiving environment (Kızılırmak). Therefore, there is no domestic pollution pressure on water resources. The amount of wastewater discharged to the receiving environment is 24,029,439 m3/year.

Out of all WWTPs in Sivas province, the closest WWTP to the Project Licence Area, is a biological WWTP namely Gürün WWTP is in Gürün district with a capacity of 3,200 m^3/day and discharged treated water to Kızılırmak River in accordance with the limit discharge values specified in the national regulation.

Table 11.4: The Capacity of the Local Existing Wastewater Treatment Plant in Sivas

Benchmark/Province	Tekirdağ
The municipal population served by the local existing treatment plants[101]	422,912
The amount of wastewater discharged daily per person (m^3/person-day) by the Municipalities[102]	0.183
The total daily amount of wastewater generated by the Municipalities and received by the WWTPs (m^3/day) [103]	28,300
The total capacities of the WWTPs (m^3/day)[104]	60,532

The Project Company planned collecting domestic wastewater generated during the construction and operation phases of the Project in a septic tank. There is already a septic tank in the Project Area and this septic tank will be used during the construction and operation phases.

It is to be noted that the septic tank will be emptied by vacuum trucks when the septic tank reaches 80% capacity to be disposed to the local existing wastewater treatment plants in accordance with the relevant legislation.

11.4 Impact Assessment

11.4.1 Construction Phase Impacts

11.4.1.1 Resource Management

When products are selected during the procurement stage, environmental and social aspects should be considered. It may initially be cheaper to buy a particular product, but savings could be lost further down the line simply because more waste is produced, or because the waste is harder to recycle or to dispose. It is to be noted that the procurement stage has already been completed as per the Project timeline. However, the Project Company has assured waste minimization by providing examples and measures such that implementing Supply Chain Management Plan that considers environmental factors when selecting suppliers and procuring materials. This includes preferring suppliers who can prioritize waste reduction, recycling and sustainable practices. This also includes establishing a clear return and exchange policy for materials or equipment that are no longer needed or are surplus to requirements which helped to avoid unnecessary waste.

The transportation of the purchased materials and equipment could increase the traffic in the Project area and could have a risk to contaminate the soil and surface water in the event of accidental spills of hydrocarbon-based oils and lubricants as well as heavy metals. In the event of extreme weather conditions (e.g., rainfall), the presence of stockpiles of exposed soil and concrete could pose a risk for high suspended solid loading within surface runoffs. Please see *Chapter 5 Water Quality, Hydrology and Hydrogeology* and *Chapter 6 Land Use, Soil and Geology* for detailed assessment regarding the impacts on soil and water sources.

For the supply of concrete material, the Project Company stated that concrete batching plant will be established in the Project area. The ready-mixed concrete and aggregate will be supplied from the ready-mixed concrete batching plants. The produced ready-mixed concrete will be delivered by a concrete mixer/transit mixer to the construction area. Therefore, the only impacts

[101] TurkStat data, 2022 Municipal Wastewater Statistics (Last updated data has been retrieved as of 19 March 2024)

[102] TurkStat, 2022 Municipal Wastewater Statistics (Last updated data has been retrieved as of 19 March 2024)

[103] TurkStat, 2022 Municipal Wastewater Statistics (Last updated data has been retrieved as of 19 March 2024)

[104] TurkStat, 2022 Municipal Wastewater Statistics (Last updated data has been retrieved as of 19 March 2024)

associated with the providing of the concrete material could be soil, groundwater and surface runoff contamination, of which detailed assessments related to these impacts included in *Chapter 5 Water Quality, Hydrology and Hydrogeology* and *Chapter 6 Land Use, Soil and Geology*.

11.4.1.2 Land Preparation, Excavation and Construction Activities

During excavation in the construction phase of the Project, topsoil is collected separately and be stored in turbine platform areas, which will be used for reinstatement purposes post-construction to re-establish green areas. If platform areas are insufficient for storage purposes, temporary storage areas onsite have been determined to be used based on worst-case scenario. It is anticipated that all top-soil retained and reused onsite and no topsoil will be exported.

During excavation process in the construction phase of the Project, the soil other than topsoil, which is excavation soil, resulting from the soil loosening activities sized to be reused. The excavation soil will be temporarily stored at turbine platforms to be used for structural filling the Project area.

If reuse of the excavation soil is not feasible due to either, it is not suitable for reuse on-site (excavation waste) or more material is excavated from the Project area than is needed for filling (excessive excavation soil), these materials will be stored in four temporary storage areas in the Project area, then to be transported and be disposed of in the disposal areas designated by the municipalities.

The excessive excavation soil refers to difference between cut volume (excavation) and the fill volume, and estimated volume of the total excessive soil is based on hourly, daily and monthly volumes are shared below.

$$\text{“}\textit{Total}\ \textbf{volume of}\ \textit{excessive excavation soil} = \textit{Cut (Excavation) volume } (m^3) - \textit{Fill Volume } (m^3)\text{”}$$

$$\text{Total volume } of\ excessive\ excavation\ soil = 245{,}562\ m^3 - 226{,}796\ m^3$$

$$\textbf{Total volume of excessive excavation soil} = \mathbf{18{,}766\ m^3}$$

$$\text{Total volume of excessive excavation soil to be generated per month} = (18{,}766\ \text{m}^3)/(13\ \text{month})$$

$$\textbf{Total volume of excessive excavation soil to be generated per month} = \mathbf{1{,}443.54\ m^3/\ month}$$

$$\text{Total volume of excessive excavation soil to be generated per day} = (1{,}443.54\ \text{m}^3/\ \text{month})\ /\ (24\ \text{day/month})$$

$$\textbf{Total volume of excessive excavation soil to be generated per day} = \mathbf{60.15\ m^3/day}$$

$$\text{Total volume of excessive excavation soil to be generated per hour} = (60.15\ \text{m}^3/\text{day})/\ (10\ \text{hour/day})$$

$$\textbf{Total volume of excessive excavation soil to be generated per hour} = \mathbf{6.015\ m^3/hour}$$

In addition to the excavation waste, the construction waste generation is anticipated. It is specified that preventing from the mixing of excavated soil with construction and demolition wastes is essential according to the Regulation on the Control of Excavation Soil, Construction, and Demolition Wastes (OG Date/Number: 18.03.2004/25406).

11.4.1.3 Waste Generation

During the construction phase of the Project, several types of waste is anticipated to be generated, potential impacts associated with the waste generation is increasing the load on the capacity of existing local waste recycling/landfilling facilities, contamination risks for soil and groundwater resources. To identify the magnitude of these impacts, waste amounts to be generated is projected based on the baseline information provided by the Project Company and defined reference data.

- Municipal waste:

According to TurkStat data (2022 Municipal Waste Statistics), the average amount of municipal waste generated in Sivas province per person is recorded as 1.42 kg/capita-day. It is anticipated that 50 workers will work during construction period.

$$\text{Municipal waste to be generated per day } = 1.42\ (\text{kg/person} * \text{day}) * 50\ \text{ person}$$

$$\mathbf{Municipal\ waste\ to\ be\ generated\ per\ day = 71\ kg/day}$$

- Packaging waste:

According to TurkStat data[105], total collected municipal waste amount is 32,324,472 tonne for 2020 year in Türkiye. For the same year, total amount of packaging waste is 9,448,743 tonnes[106]. Thus, with the assumption that the general trend is similar, packaging waste will constitute 29.2% of the total municipal waste in terms of weight also for the Project.

$$\text{Packaging waste to be generated per day} = 71\ (\text{kg/day}) * 0.29$$

$$\mathbf{Packaging\ waste\ to\ be\ generated\ per\ day\ = 20.59\ kg/day}$$

Packaging waste is defined as all packaging waste introduced into the domestic market, irrespective of material (plastic, metal, glass, paperboard, composite, etc.) and source (household, industrial, commercial, workplace), as specified on the Packaging Waste Control Regulation (OG Date/Number: 26.06.2021/31523).

The packaging waste (paper, cardboard, metal, glass, rubber, textiles, plastic, etc.) will be separately managed from other waste streams at the source. It will be collected, stored in separate locations in the waste storage area, and periodically delivered to a licensed waste collection company in accordance with the provisions of the Packaging Waste Control Regulation (OG Date/Number: 26.06.2021/31523).

- Hazardous waste:

The maintenance and repair processes of machinery and equipment to be used during the construction phase of the Project may potentially generate hazardous waste categorized as contaminated (such as oily rags, empty lubricating oil containers, used filters from machinery, etc.

Hazardous waste generated per capita (excluding major mineral wastes) is 36.7 kg for 2018[107]. It is anticipated that 50 workers will work during construction period. It is planned to be worked 26 days monthly and 312 days annually.

$$\text{Hazardous waste to be generated per day} = 36.7 \frac{\text{kg}}{\text{year} * \text{capita}} * \frac{1\ \text{year}}{312\ \text{day}} * 50\ \text{person}$$

$$\mathbf{Hazardous\ waste\ to\ be\ generated\ per\ day = 5.8\ kg/day}$$

[105] The data is sourced from the “Municipal Waste Statistics” database of the TurkStat website reflecting the date information (year 2020) as of March 2024. Retrieved from https://www.tuik.gov.tr/

[106] The data is sourced from the “2020 Packaging Waste Bulletin” published by Ministry of Environment, Urbanization, and Climate Change, General Directorate of Environmental Management. Retrieved from https://cygm.csb.gov.tr/dongusel-ekonomi-ve-atik-yonetimi-dairesi-baskanligi-i-85475

[107] The source of this information is based on the 2018 data from the TurkStat Sustainable Development Indicators (2010+) Report, published in February 2021. It represents the ratio of total hazardous waste per capita, excluding large-volume mineral waste, screening sludge, and contaminated soil. The data is compiled from municipalities, healthcare institutions, manufacturing industrial facilities, thermal power plants, completed infrastructure organized industrial zones, as well as mining and quarrying operations. Retrieved from https://data.tuik.gov.tr/Bulten/Index?p=Surdurulebilir-Kalkinma-Gostergeleri-2010-2019-37194&dil=1

During the maintenance and repair processes of the machinery and equipment used in the construction phase of the Project, potentially generated hazardous waste such as contaminated materials (oily rags, empty lubricating oil containers, used filters from machinery, etc.) will be accumulated separately in leak-proof containers. All wastes with hazardous characteristics will be stored separately in the hazardous waste storage area.

Within the framework of the Project, hazardous wastes generated such as oil, fuel, empty oil containers, materials contaminated with chemicals including brushes, rags, paint containers, fluorescent lamps, electrical cables, etc. will be segregated and stored in containers marked "Hazardous Waste". Wastes possessing hazardous characteristics will be stored separately in a designated hazardous waste storage area designed to be leak-proof.

For temporary waste storage area, each container will be classified based on its characteristics, with clear indications of whether it is hazardous or non-hazardous, the waste code, the quantity of stored waste, and the storage date.

- Medical waste:

The amount of medical waste constitutes of 6.8% of the total hazardous waste amount[108]. Thus, with the assumption that the general trend is similar, medical waste to be generated is projected below.

$$\text{Medical waste to be generated per day} = 5.8\frac{\text{kg}}{\text{day}} * 0.068$$

$$\mathbf{Medical\ waste\ to\ be\ generated\ per\ day} = \mathbf{0.39\ kg/day}$$

An infirmary will not be established within the scope of the Project and in case of any health problem, the workers will be referred to the nearest health institution. The medical wastes will be collected separately from municipal waste, in accordance with the relevant provisions of the "Regulation on the Control of Medical Waste" (OG Date/Number: 25.01.2017/29959) to be disposed of in accordance with the regulation.

- Waste batteries and accumulators:

The vehicle accumulator replacement during the construction phase is anticipated to be carried out by authorized external services, accumulation of waste accumulators in the Project area is not anticipated. During the construction phase, waste batteries generated will be collected and sent to licensed firms for proper disposal. In Türkiye, the battery waste is generated approximately 4-5 per person annually[109].

$$\text{Waste batteries to be generated per year} = 5\frac{\text{batterias}}{\text{year} * \text{capita}} * 50\ \text{person}$$

$$\mathbf{Waste\ batteries\ to\ be\ generated\ per\ year} = \mathbf{250\ batteries/year}$$

The waste batteries will be collected separately from municipal waste, in accordance with the relevant provisions of the "Regulation on the Control of Waste Batteries and Accumulators" (OG Date/Number: 31.08.2004/25569) to be transferred to companies engaged in the distribution

[108] According to the information shared in the website of the MoEUCC, the National Waste Declaration System namely "TABS" reported that 16,388 facilities submitted declarations for a total of 125,566 tons of medical waste in 2020. This figure constitutes 6.8% of the total hazardous waste quantity, excluding mining wastes. Retrieved from https://cevreselgostergeler.csb.gov.tr/tibbi-atiklar-i-85754

[109] Regional Environment Center (REC) Türkiye. (2016). Waste Batteries and Accumulators Control Regulation: Municipality Application Guidance. Retrieved from https://rec.org.tr/wpcontent/uploads/2016/11/apa_rehberi.pdf

and sale of batteries or collection points established by municipalities, in compliance with the regulations.

- Vegetable oil waste:

During the construction phase, employee's meals will be provided by contracted catering companies, thus generation of waste vegetable oil is not anticipated. In case of any change in the during the construction phase, the calculation of vegetable waste oil according to the worst case scenario is made below. Other social activities conducted on-site are also not expected to generate vegetable oil waste. The vegetable oil waste to be generated is projected based on Hazardous Waste Declaration System (TABS) data that vegetable oil waste would constitute 0.7% of the total hazardous waste amount.

$$\text{Waste vegetable oil to be generated per day} = 5.8\frac{\text{kg}}{\text{day}} * 0.007$$

$$\mathbf{Waste\ vegetable\ oil\ to\ be\ generated\ per\ day} = \mathbf{0.04\ kg/day}$$

The vegetable oil waste to be generated will be collected in a clean and lidded container, separately from other wastes. Used cooking oils will not be disposed of into sewage systems, soil, water bodies, or similar receiving environments to protect the environment. The disposal of vegetable oil waste will be carried out pursuant to the “Regulation on the Control of Vegetable Oil Waste” (OG Date/Number: 06.06.2015/29378).

- Waste oils:

During the construction phase of the Project, the anticipated waste oil types can be identified as hydraulic oil wastes (under the waste code of 13 01), engine, transformers and switchyard lubricating oil wastes (under the waste code of 13 02), insulation and heat conduction oil waste (under the waste code of 13 03), and liquid fuel waste (under the waste code of 13 07) in accordance with Waste Management Regulation (OG Date/Number: 02.04.2015/29314).

According to the Hazardous Waste Declaration System (TABS), the quantity of oil constitutes 3.6% of the total hazardous waste amount[110]. Thus, with the assumption that the general trend is similar, waste oil to be generated is projected below.

$$\text{Waste oil to be generated per year} = 5.8\ \text{kg/day} * 0.036$$

$$\mathbf{Waste\ oil\ to\ be\ generated\ per\ year} = \mathbf{0.20\ kg/day}$$

The oil changes for the construction phase machinery of the Project will primarily be carried out by authorized services. In the worst-case scenario, the waste oil to be generated during the machinery oil changes is anticipated as 0.5 tonne annually.

In cases where oil changes are mandatory within the site, the compliance with the Waste Oil Management Regulation (OG Date/Number: 21.12.2019/30985) will be ensured.

The disposal of end-of-life waste oils within the scope of the Project will be conducted in licensed disposal facilities, as stipulated in the “Regulation on the Management of Waste Oils” (OG Date/Number: 21.12.2019/30985). Additionally, waste oils and solid wastes contaminated with hazardous substances will be sent to licensed hazardous waste disposal facilities for proper disposal.

[110] According to the information shared in the website of the MoEUCC, the National Waste Declaration System namely “TABS” reported most recent data that a total of 67,379 tons of waste oil was generated in 2020. This figure constitutes 3.6% of the total hazardous waste quantity. Retrieved from https://cevreselgostergeler.csb.gov.tr/atik-madeni-yaglar-bitkisel-atik-yaglar-atik-piller-atik-akumulator-atik-elektrikli-ve-elektronik-esyalar-omrunu-tamamlamis-lastik-ve-araclar-i-85755

In accordance with the conditions outlined in the “Regulation on the Management of Waste Oils” (OG Date/Number: 21.12.2019/30985) temporary storage within the facility will be organized according to their respective categories, adhering to standards. The transportation of waste oils to disposal facilities will be carried out using licensed carriers. The obligations of waste oil producers, as specified in Article 8 of the “Regulation on the Management of Waste Oils” (OG Date/Number: 21.12.2019/30985) will be strictly adhered to.

In case of any oil leakage caused by construction machinery, the relevant provisions in the "Regulation on the Control of Soil Pollution and Point Source Contaminated Areas" (OG Date/Number: 08.06.2010/27605) will be complied with.

- End-of-life tyres (ELTs):

Within the Project scope, the maintenance and repairs of vehicles used during the construction phase will be conducted at nearby stations located in residential areas. Therefore, the formation of ELTs within the Project area is not anticipated. However, in the case of ELTs generated due to tire shredding, an average of 1 set (4 pieces) of ELTs is expected annually per vehicle.

In the event of an unforeseen circumstance resulting in the generation of the ELT wastes within the scope of the activities, the “Regulation on the Control of End-of-Life Tires” (OG Date/Number: 25.11.2006/26357) will be adhered to. According to the provisions of this regulation, ELTs will not be stored on-site. Instead, they will be delivered to companies engaged in tire distribution and sales or authorized carriers in accordance with the regulation.

All waste management practices during the construction phase of the Project will be carried out in compliance with the national regulations and applicable international standards and guidelines.

It should be noted that some of the workers will be employed from local communities living in the vicinity of the Project area and other nearby settlements. Therefore, considering that the local workers are already contributing to the waste generation of the Sivas province, the actual load on the capacity of the local waste management facilities caused by the Project will be lower than the estimated amount. In addition, separate collection of packaging waste will be encouraged to decrease the total generated amount of municipal waste that will be landfilled.

11.4.1.4 Wastewater

The domestic wastewater generated at site during the construction phase will be collected in the septic tanks at the construction sites and will be transported via vacuum trucks to the existing operational licensed wastewater treatment plants. Therefore, there will be no disposal of wastewater from construction site into the receiving environment.

The amount of drinking and potable water, published by TurkStat (2022 Municipal Statistics), for the personnel planned to work within the scope of the Project was determined as 297 L/person-day for Sivas province. It is anticipated that 50 personnel will work during construction period.

Additionally, it is assumed that the amount of water used will be transformed into wastewater completely. Thus, amount of wastewater to be produced in the construction period can be calculated as follows:

$$\text{Wastewater to be produced} = 297\ (\text{L/person} * \text{day}) * 50\ \text{Person}$$

$$\mathbf{Wastewater\ to\ be\ produced} = \mathbf{14{,}850}\ \frac{\mathbf{L}}{\mathbf{day}} = \mathbf{14.85\ m^3/day}$$

The treatment and disposal of waste and wastewater are provided out of the Project area in construction phase. Therefore, the potential disturbances such as noise, dust, and visual

pollution are avoided, contributing the preservation of the immediate impact on the area of influence.

The domestic wastewater will be collected in a watertight septic tank structure in compliance with the Regulation on the Construction of Pits for Domestic Wastewater in Locations Where Sewerage System Construction is Not Possible (OG Date/Number: 09.03.1971/13783).

For the construction phase of the Project, approximate dimensions for a septic tank are estimated based on a daily wastewater generation of 62 m^3/day and factoring in an 80% filling capacity of a septic tank and retention time is taken a day during which wastewater stays in the tank before it is vacuumed by vacuum truck. It is anticipated that there would be three septic tanks with a same capacity at three different points in the Project area to meet sanitation need of the workers.

The effective volume of each septic tank would be 16.5 m^3/day (By multiplying daily wastewater generation with filling rate of the septic tank and retention time). The depth of the tank is typically around 2 meters, approximate dimensions for the length and width of the tank could be chosen as 3 and 2.75 meters. If the septic tank has a total volume of 16.5 m^3 and it is desired to empty it when it reaches 80% capacity with and assumption that each vacuum truck can remove 20 m^3 of wastewater, approximately one vacuum truck' visit will be needed.

These dimensions are preliminary and subject to adjustment as per the regulation above mentioned and considerations related to construction feasibility and available space.

11.4.2 Operation Phase Impacts

11.4.2.1 Resource Management

When purchasing materials in the operation phase, environmental and social aspects will be considered. It is to be noted that the procurement stage has already been completed as per the Project timeline. However, the Project Company has assured waste minimization by providing examples and measures such that implementing Corporate Supply Chain Management Plan that considers environmental factors when selecting suppliers and procuring materials. This includes preferring suppliers who can prioritize waste reduction, recycling and sustainable practices. This also includes establishing a clear return and exchange policy for materials or equipment that are no longer needed or are surplus to requirements which helped to avoid unnecessary waste.

11.4.2.2 Waste Generation

It is known that the recyclable portion of generated waste (e.g., packaging waste) is sent to the relevant recycling facilities by the licensed recycling company. The non-recyclable portion of waste generated during operation activities are mostly municipal waste, which are sent to sanitary landfills by the Municipality. Generated hazardous waste such as waste oils, waste batteries and accumulators, and other hazardous waste are collected and disposed by the licensed companies according to the relevant legislation. The anticipated waste generated by the activities during the operation phase are shared based on their types, estimated amounts, and impacts on receptors as assessed below.

- Municipal waste:

According to TurkStat data (2022 Municipal Waste Statistics), the average amount of municipal waste generated in Sivas province per person is recorded as 1.42 kg/capita-day. It is anticipated that 20 workers will work during operation phase.

$$\text{Municipal waste to be generated per day } = 1.42\ (\text{kg/person} * \text{day}) * 20\ \text{person}$$

$$\mathbf{Municipal\ waste\ to\ be\ generated\ per\ day} = \mathbf{28.4\ kg/day}$$

- Packaging waste:

According to TurkStat data[111], total collected municipal waste amount is 32,324,472 tonne for 2020 year in Turkey. Total amount of packaging waste is 9,448,743 tonne for 2020 year[112]. Thus, packaging waste constitutes 29.2% of the total municipal waste in terms of weight.

$$\text{Packaging waste to be generated per day} = 28.4\ \text{kg/day} * 0.29$$

$$\mathbf{Packaging\ waste\ to\ be\ generated\ per\ day} = \mathbf{8.2\ kg/day}$$

Packaging waste is defined as all packaging introduced into the domestic market, irrespective of material (plastic, metal, glass, paperboard, composite, etc.) and source (household, industrial, commercial, workplace), as specified on the Packaging Waste Control Regulation (OG Date/Number: 26.06.2021/31523).

The packaging waste (paper, cardboard, metal, glass, rubber, textiles, plastic, etc.) will be separately managed from other waste streams at the source. It will be collected, stored at separate locations, and periodically delivered to a licensed waste collection company in accordance with the provisions of the Packaging Waste Control Regulation (OG Date/Number: 26.06.2021/31523).

- Hazardous waste:

The maintenance and repair processes of machinery and equipment to be used during the operation phase of the Project may potentially generate hazardous waste categorized as contaminated (such as oily rags, empty lubricating oil containers, used filters from machinery, etc.).

Hazardous waste generated per capita (excluding major mineral wastes) is 36.7 kg per person for 2018 year[113]. It is anticipated that 20 employees will work during operation period. It is planned to be working 26 days monthly and 312 days annually. Thus, with the assumption that the general trend is similar, hazardous waste to be generated is projected below.

$$\text{Hazardous waste to be generated per day} = 36.7 \frac{\text{kg}}{\text{year} * \text{capita}} * \frac{1\ \text{year}}{312\ \text{day}} * 20\ \text{person}$$

[111] The data is sourced from the "Municipal Statistics" database of the TurkStat website reflecting the latest available date information (year 2020) as of November 2023. Retrieved from https://www.tuik.gov.tr/

[112] The data is sourced from the "2020 Packaging Waste Bulletin" published by Ministry of Environment, Urbanization, and Climate Change, General Directorate of Environmental Management. Retrieved from https://cygm.csb.gov.tr/dongusel-ekonomi-ve-atik-yonetimi-dairesi-baskanligi-i-85475

[113] The source of this information is based on the 2018 data from the TurkStat Sustainable Development Indicators (2010+) Report, published in February 2021. It represents the ratio of total hazardous waste per capita, excluding large-volume mineral waste, screening sludge, and contaminated soil. The data is compiled from municipalities, healthcare institutions, manufacturing industrial facilities, thermal power plants, completed infrastructure organized industrial zones, as well as mining and quarrying operations. Retrieved from https://data.tuik.gov.tr/Bulten/Index?p=Surdurulebilir-Kalkinma-Gostergeleri-2010-2019-37194&dil=1

$$\textbf{Hazardous waste to be generated per day} = \mathbf{2.4\ kg/day}$$

Within the framework of the Project, hazardous wastes generated such as oil, fuel, empty oil containers, materials contaminated with chemicals including brushes, rags, paint containers, fluorescent lamps, electrical cables, etc. will be segregated and stored in containers marked "Hazardous Waste". Wastes possessing hazardous characteristics will be stored separately in a designated hazardous waste storage area designed to be leak-proof.

For temporary storage, each container will be classified based on its characteristics, with clear indications of whether it is hazardous or non-hazardous, the waste code, the quantity of stored waste, and the storage date.

- Medical waste:

The amount of medical waste constitutes of 6.8% of the total hazardous waste amount[114].

$$\text{Medical waste to be generated per day} = 2.4\ \frac{\text{kg}}{\text{day}} * 0.068$$

$$\textbf{Medical waste to be generated per day} = \mathbf{0.16\ kg/day}$$

During the operation phase, 20 personnel will be employed. As the number of personnel working is below 50, there is no obligation to have an occupational physician, according to the "Regulation on the Duties, Authorities, and Working Principles of Occupational Health and Safety Units and Occupational Physicians" (OG Date/Number: 16.12.2003/25717). In workplaces with fewer than 50 employees, the employer provides a suitable place for occupational health and safety services to be effectively delivered by the occupational physician, occupational safety specialist, and other healthcare personnel throughout working hours, as per the Regulation on Occupational Health and Safety Services (OG Date/Number: 29.12.2012/28512). A suitable place, capable of providing basic first aid interventions (staff will receive basic first aid training), will be established for emergencies, although it will not be equipped as a comprehensive medical treatment unit. The generated medical waste will be significantly lower than the calculated medical waste data. In the event of significant injuries within the Project area, the nearest healthcare facilities will be utilized. In case of minor accidents, medical wastes will be segregated from other wastes, collected in leak-proof medical bags, and delivered to vehicles with a medical waste collection license and sent to medical waste disposal/sterilization facilities that have obtained environmental permits and licenses.

- Waste batteries and accumulators:

During the operation phase, waste batteries will be generated due to employees' activities. The resulting waste batteries will be collected and sent to licensed firms for proper disposal. The assumption is that vehicle accumulator replacements during the operation phase will be carried out by authorized external services, minimizing on-site waste accumulation. In Türkiye, the battery waste is generated approximately 4-5 batteries per person annually[115].

$$\text{Waste batteries to be generated per year} = 5\frac{\text{batterias}}{\text{year} * \text{capita}} * 20\ \text{person}$$

$$\textbf{Waste batteries to be generated per year} = \mathbf{100\ batteries/year}$$

[114] According to the information shared by the website of the MoEUCC, the National Waste Declaration System namely "TABS" reported that 16,388 facilities submitted declarations for a total of 125,566 tons of medical waste in 2020. This figure constitutes 6.8% of the total hazardous waste quantity, excluding mining wastes. Retrieved from https://cevreselgostergeler.csb.gov.tr/tibbi-atiklar-i-85754

[115] Regional Environment Center (REC) Türkiye. (2016). Waste Batteries and Accumulators Control Regulation: Municipality Application Guidance. Retrieved from https://rec.org.tr/wp-content/uploads/2016/11/apa_rehberi.pdf

If generated within the scope of the activities, waste batteries will be collected separately from municipal waste, in accordance with the relevant provisions of the "Regulation on the Control of Waste Batteries and Accumulators" (OG Date/Number: 31.08.2004/25569) to be transferred to companies engaged in the distribution and sale of batteries or collection points established by municipalities, in compliance with the regulations.

- Vegetable oil waste:

During the operation phase, employee's meals will be provided by contracted catering companies at the at the administrative building, thus generation of waste vegetable oil is not anticipated. In case of any change in the during the operation phase, the calculation of vegetable waste oil according to the worst case scenario is made below. Other social activities conducted on-site are also not expected to generate vegetable oil waste. However, in a worst-case scenario, if vegetable oil waste is generated within the WPP, it is estimated based on TABS data that vegetable oil waste would constitute 0.7% of the total hazardous waste amount[116].

$$\text{Waste vegetable oil to be generated per day} = 2.4\frac{\text{kg}}{\text{day}} * 0.007$$

$$\mathbf{Waste\ vegetable\ oil\ to\ be\ generated\ per\ day} = \mathbf{0.016\ kg/day}$$

In the worst-case scenario of vegetable oil waste generation within the Wind Power Plant, it will be collected in a clean and lidded container, separately from other wastes. Used cooking oils will not be disposed of into sewage systems, soil, water bodies, or similar receiving environments to protect the environment. In this context, compliance with the provisions of the "Regulation on the Control of Vegetable Oil Waste" (OG Date/Number: 06.06.2015/29378), will be ensured for the disposal of vegetable oil waste.

- Waste oils:

During the construction phase of the Project, the anticipated waste oil types can be identified as hydraulic oil wastes (under the waste code of 13 01), engine, transformers and switchyard lubricating oil wastes (under the waste code of 13 02), insulation and heat conduction oil waste (under the waste code of 13 03), and liquid fuel waste (under the waste code of 13 07) in accordance with Waste Management Regulation (OG Date/Number: 02.04.2015/29314).

While the exact percentage cannot be determined during the planning stage, an approximately 0.5 tonne per year waste oil generation is projected for the maintenance purposes.

According to the Hazardous Waste Declaration System (TABS), the quantity of oil constitutes 3.6% of the total hazardous waste amount[117].

$$\text{Waste oil to be generated per year} = 500\ \text{kg/year} * 0.036$$

$$\mathbf{Waste\ oil\ to\ be\ generated\ per\ year} = \mathbf{18\ kg/year}$$

The disposal of end-of-life waste oils within the scope of the Project will be conducted in licensed disposal facilities, as stipulated in the "Regulation on the Management of Waste Oils"

[116] According to the information shared in the website of the MoEUCC, the National Waste Declaration System namely "TABS" reported most recent data that a total of 13,008 tons of vegetable oil waste was generated in 2020. This figure constitutes 0.7% of the total hazardous waste quantity. Retrieved from https://cevreselgostergeler.csb.gov.tr/atik-madeni-yaglar-bitkisel-atik-yaglar-atik-piller-atik-akumulator-atik-elektrikli-ve-elektronik-esyalar-omrunu-tamamlamis-lastik-ve-araclar-i-85755

[117] According to the information shared in the website of the MoEUCC, the National Waste Declaration System namely "TABS" reported most recent data that a total of 67,379 tons of waste oil was generated in 2020. This figure constitutes 3.6% of the total hazardous waste quantity. Retrieved from https://cevreselgostergeler.csb.gov.tr/atik-madeni-yaglar-bitkisel-atik-yaglar-atik-piller-atik-akumulator-atik-elektrikli-ve-elektronik-esyalar-omrunu-tamamlamis-lastik-ve-araclar-i-85755

(OG Date/Number: 21.12.2019/30985). Additionally, waste oils and solid wastes contaminated with hazardous substances will be sent to licensed hazardous waste disposal facilities for proper disposal.

In accordance with the conditions outlined in the “Regulation on the Management of Waste Oils” (OG Date/Number: 21.12.2019/30985) temporary storage within the facility will be organized according to their respective categories, adhering to standards. The transportation of waste oils to disposal facilities will be carried out using licensed carriers. The obligations of waste oil producers, as specified in Article 8 of the “Regulation on the Management of Waste Oils” (OG Date/Number: 21.12.2019/30985) will be strictly adhered to.

In case of any oil leakage caused by construction machinery, the relevant provisions in the "Regulation on the Control of Soil Pollution and Point Source Contaminated Areas" (OG Date/Number: 08.06.2010/27605) will be complied with.

- End-of-life tyres (ELTs):

Within the Project scope, the maintenance and repairs of vehicles used during the operation phase will be conducted at nearby stations located in residential areas. Therefore, the generation of ELTs within the Power Plant is not anticipated. However, in the case of ELTs generated due to tire shredding, an average of 1 set (4 pieces) of ELTs is expected annually per vehicle.

In the event of an unforeseen circumstance resulting in the generation of the ELT wastes within the scope of the activities, the “Regulation on the Control of End-of-Life Tires” (OG Date/Number: 25.11.2006/29292) will be adhered to. According to the provisions of this regulation, ELTs will not be stored on-site. Instead, they will be delivered to companies engaged in tire distribution and sales or authorized carriers in accordance with Article 5 of the regulation.

- All waste management practices during the operation phase of the Project will be carried out in compliance with the national regulations and applicable international standards and guidelines.

11.4.2.3 Operation and Maintenance Waste

The lifetime of the wind turbines are typically 20 years of which depends on the environmental conditions e.g., wind shear, air density and operational conditions e.g., number of shutdowns[118]. The turbine properties are also an important factor. Within the scope of the Project, Nordex Delta 4000 series wind turbine will be used. According to the technical specification of the wind turbines to be used for the Project, the design service life of the turbines is 25 years.

The Project is planned to be operated for 49 years. Therefore, the planning before the end-of-life of the wind turbines is required to identify the necessary measures taken for maintaining sustainable operation of the Project. Even the potential impacts associated with the waste generation during the decommissioning phase is scope out of this Report, management of the end-of-life of wind turbines are questioned. The Project Company informed the Consultant that the reuse and/or recycling opportunities for the end-of-life wind turbines will be evaluated by carrying out life cycle analysis in accordance with ISO 14040 standard and considering the local market’ needing. Dismantling of concrete tower and installing new wind turbines with site-specific technologies for minimising yield losses and reusing of some dismantled components of wind turbines will be considered therewith.

[118] Lisa Ziegler, Elena Gonzalez, Tim Rubert, Ursula Smolka, Julio J. Melero, Lifetime extension of onshore wind turbines: A review covering Germany, Spain, Denmark, and the UK, Renewable and Sustainable Energy Reviews, Volume 82, Part 1,2018, Retrieved from (https://www.sciencedirect.com/science/article/pii/S1364032117313503)

The lifetime of the wind turbines can be prolonged and optimum operation can be ensured by conducting periodic inspections. The periodic inspections required for the power plant are listed below.

- Inspection on safety relevant components and functions e.g., lightning protection system, pitch and yaw control, anchorage points and safety ladder.
- Periodic inspection of electrical equipment including radio links, emergency generators, and batteries in the electrical infrastructure system once a year
- Comprehensive mechanical maintenance of wind turbines for every four or five years
- Periodic lubrication, electrical and mechanical maintenance of wind turbines quarterly
- Periodic inspection for lubrification of wind turbines will be conducted annually, of which any lubricants that have been used up are refilled. For each turbine, 150 litres lubricant is anticipated to be used averagely. For 14 turbines, average waste oil generation due to operation and maintenance works are calculated below.

$$\textbf{Waste oil to be generated per year} = \textbf{14 turbine} * \textbf{150 lt/year} = \textbf{2100 lt/year}$$

During the operation phase of the Project, the wind turbines, which cannot be reused, are required to be repaired or disposed of in case of any problem; they will be stored in the turbine platforms temporarily to be transferred to recycle or disposal facilities by the turbine manufacturer.

The Wind Power Plant will comply with the national regulations and apply applicable international standards and guidelines for waste oil management.

11.4.2.4 Wastewater

The domestic wastewater generated at site during the operation phase will be collected in the septic tanks and will be transported via vacuum trucks to the existing local wastewater treatment plants in the close vicinity of the Wind Power Plant. Therefore, there will be no disposal of wastewater from the operational activities into the receiving environment.

The amount of drinking and potable water, published by TurkStat (2022 Municipal Statistics), for the personnel planned to work within the scope of the Project was determined as 297 L/person-day for Sivas province. It is anticipated that 20 personnel will work during construction period.

Additionally, it is assumed that the amount of water used will be transformed into wastewater completely. Thus, amount of wastewater to be produced in the operation period can be calculated as follows:

$$\text{Wastewater to be produced} = 297\ (\text{L/person} * \text{day}) * 20\ \text{Person}$$

$$\textbf{Wastewater to be produced} = \ \mathbf{5,940}\,\frac{\mathbf{L}}{\mathbf{day}} = \mathbf{5.9\ m^3/day}$$

The treatment and disposal of waste and wastewater are provided out of the Project area in operation phase. Therefore, the potential disturbances such as noise, dust, and visual pollution are avoided, contributing the preservation of the immediate impact on the area of influence.

11.4.3 Summary

Assessment of impacts on waste and resources are conducted based on the methodology presented in Section 11.2. Accordingly, the magnitude of each impact is estimated as a factor of the foreseen: geographic extent, duration, reversibility, and frequency of the impact, based on expert's judgement. Sensitivity/value of the associated resource/receptor was determined in consideration of the baseline conditions described in the previous sections and typical

descriptor of defined in Section 11.3. Specific sensitivity/value criteria considered in assessing the impacts on waste and resources is provided below.

Table 11.5: Waste and Resource Sensitivity/Value Criteria for Resource/Receptors

Resource/Receptor	High	Medium	Low	Negligible
Local community members / nearby settlements to be affected from Community Health and Safety related concerns by transport of waste from site to waste disposal areas	Local community members who are close to the Project Area can easily access the Project Licence area.	Local community members are located near the Project Area where can easily, close to WPP License Area	Local community members are identified away from WPP License Area (>10 km)	No local community member is identified nearby
The existing local waste and wastewater infrastructure (e.g., waste disposal facilities, waste transfer stations, wastewater treatment plants)	Insufficient local waste disposal facilities including landfills, waste transfer stations, excavation waste disposal facilities	The landfills that are close to their end-of-life	Insufficient existing local wastewater treatment plants in terms of technical capabilities and capacity	Existing local licenced waste recycling/disposal companies for the management of waste types e.g., medical, waste batteries and accumulators
Soil (Contamination)	Nationally and internationally protected areas, areas with ecologically critical habitat status	Lands having national importance, Lands having Class I-II land use capability, residential areas	Lands having Class III-IV land use capability.	Lands having Class V-VIII land use capability, industrial and mining areas.
Groundwater bodies	Project Area is located within groundwater protection zone	Groundwater is being used as major water source by local communities	Limited groundwater is available, city network for water supply is available	No groundwater source is available, groundwater table is too high

Table 11.6: Waste and Resource Magnitude Criteria for Resource/Receptors

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Soil Contamination due to poor waste management	Lands with Class VII & VIII LUC	Minor	Construction	AoI	Reversible	Unlikely	Minor	Low	Minor
Life and Fire Safety vulnerability due to not properly stored waste	Forest Area	Minor	Construction	AoI	Reversible	Possible	Minor	High	Minor
Poor management of high-volume excavation waste due to insufficient storage conditions onsite and offsite.	Existing local excavated soil disposal waste disposal areas and the Project area	Medium	Construction	AoI	Reversible	Possible	Minor	Low to High	Moderate to High
Increase in load on the capacity of existing waste recycling/landfilling facilities	Existing local waste disposal facilities including landfills, waste transfer stations	Medium	Construction and Operation	AoI	Reversible	Occurring regularly under typical conditions	Minor	Low	Moderate
Runoff from the exposed soil and concrete stockpiles	Surface water bodies	Minor	Construction	AoI	Reversible	Unlikely	Minor	High	Minor
Groundwater contamination due to poor waste management	Groundwater	Minor	Construction and Operation	AoI	Reversible	Unlikely	Minor	Medium	Minor
Increase in the load on the capacity of the existing wastewater treatment plants	Existing local wastewater treatment plants	Medium	Construction and Operation	AoI	Reversible	Occurring regularly under typical conditions	Negligible	Low	Negligible

11.5 Impact Mitigation & Residual Impact

This section presents mitigation measures and residual impacts to manage potential waste and resources related impacts during construction and operation. The mitigation measures have been identified based on the potential impacts identified above. The waste hierarchy will be followed as a methodology when addressing the impacts particularly for the cases where waste generation is unavoidable, it is essential to reuse, recycle and recover secondary raw materials, use them as an energy source or dispose of them in a hierarchical order. The prevention, reuse, recycling recovery and disposal will be followed hierarchically as most preferred management methods in a given order.

Mitigation during Construction

Following mitigation measures have been identified for sustainable resource management during the construction phase of the Project:

- Using less harmful materials where possible, considering the GHG emissions of alternative materials and considering the impacts of extraction, processing and transport. In particular with source aggregates and materials from quarries operating with valid environmental and other permits and licenses and where the sites are managed in full compliance with all applicable environmental standards and specifications.
- Sourcing materials from local suppliers wherever possible so that construction materials are sourced from locations (material plants/borrow pits etc.) as close as possible to the Project site to minimize impacts related to transport.
- Monitor and manage energy consumption of the mobile crushing and screening machine to minimize the Project's overall environmental footprint.

Techniques for prevention, minimization, and control of waste associated impacts during the construction phase include:

- Hazardous materials to be generated during the construction phase will be properly segregated and stored in waste storage area with appropriate secondary containment.
- If the use of the temporary storage areas for excavated soil are deemed necessary, approval from the Regional Directorate of the State Hydraulic Works (DSI) and the Regional Directorate of Forestry will be obtained.
- The excavation soil material will be reused in levelling and landscaping as appropriate.
- Concrete waste should be stored on an impermeable surface within the project area to prevent groundwater contamination. Concrete waste should be removed by a licensed disposal company.
- Techniques for prevention, minimization, and control of wastewater associated impacts during the construction phase include:
- In the design of septic tanks, provisions published in the Official Gazette "Regulation on Pits to be Constructed in Places Where Construction of Sewage Channels is Not Possible" (OG Date/Number: 19.03.1971/13783) must be complied with.

Mitigation during Operation

Following resource management practices will be applied for the sustainable operation of the Project:

- Energy management program will be implemented including identification, and regular measurement and reporting of principal energy flows within a facility, definition and regular review of energy performance targets, and regular comparison and monitoring of energy flows with performance targets to identify where action should be taken to reduce internal energy use and maximize energy harness from the wind turbines. Digital energy monitoring

and verification, building digitization, automation system, operational set points for Administration Building including a SCADA room and lighting, equipment will be considered.

- Passive efficiency measures (increase the insulation of walls or windows, reduce the need for artificial lighting, maximize opportunities for daylighting and natural ventilation where appropriate etc.) will be considered.
- The reuse and/or recycling opportunities for the end-of-life wind turbines will be evaluated and for the wind turbines, which cannot be reused, are required to be repaired or disposed of in case of any problem; they will be stored in the turbine platforms temporarily to be transferred to recycle or disposal facilities by the turbine manufacturer. Some components of end-of-life wind turbines will be reused as spare parts. Dismantling of concrete tower with site-specific technologies will be applied.
- Regular visual inspection/audits and maintenance programme will be established to minimise breakdowns/repairs/replacements and extent life of wind turbines.
- All activities undertaken will adhere to relevant legislation and comply with the applicable national legislation specified in Section 11.2.1 of this Report.

Mitigations during both Construction and Operation

Following mitigation measures have been identified for sustainable resource management during both the construction and operation phase of the Project:

- The existing systems and verification practices (i.e., Supply Chain Management Plan) to identify where the supply is coming from and to limit procurement to suppliers that can demonstrate that they are not contributing to significant conversion or degradation of ecosystems will be a criteria used to evaluate the potential suppliers during the selection process.
- Engaging with suppliers to substitute raw materials or inputs with less hazardous or less toxic materials wherever economically and technically feasible will be ensured.
- Environmental and social performance of a supplier to ensure that materials to be sourced are disposed of with sustainable principles will be assessed.
- Efficient planning of the construction and operation activities to minimize materials and optimizing the use of resources to avoid potential waste will be conducted.

Techniques for prevention, minimization, and control of waste generated by the employee related impacts during the construction and operation phase include:

- The Project Company, and sub-contractors will be responsible in the construction and operation phase of the Project will work together to facilitate proper waste handling and disposal from the site.
- The Project Company and sub-contractors will segregate and separate the wastes properly to encourage recycling of some useful waste materials.
- Waste collection and segregation area will be established according to the applicable national regulations and international standards. The waste storage area will be organized according to respective waste categories (European Waste Codes).
- Designated waste segregation areas will be used for regular waste removals to ensure waste does not build up on site of works. The non-recyclable portion of waste will be stored in relevant storage areas and collected by the Municipalities to be sent to designated landfill facilities that are operated by the municipality in line with the environmental and safety standards and legislation.
- Hazardous wastes will not be mixed with other solid waste generated and will be managed by way of incineration or landfilling.

- Adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids will be provided.
- Impervious surfaces for refuelling areas and other fluid transfer areas will be used.
- Personnels on the correct transfer and handling of fuels and chemicals and the response to spills will be trained.
- Portable spill containment and clean up equipment on site and training in the equipment deployment will be provided.
- All personnel involved in waste handling will be trained on the waste handling treatment, and disposal techniques. Correct and efficient waste management will only be achieved through rigorous training and education of employees, supervisors and managers.
- Corporate Waste Management Plan in accordance with the national and international standards will be implemented. The management plan acknowledges the key waste management practices such as, waste minimization, proper collection segregation, storage, transportation treatment and disposal of the waste, which in turn ensures that the correct disposal procedures are taken, personnel safety is maintained, and environmental harm is minimized.
- Waste minimization will be integrated in the Waste Management Plan of the Project to ensure that waste generation will be the barest possible minimum at source. Accordingly, following strategies are proposed as waste minimization strategies.
  - Purchasing will be restricted to ensure the selection of less wasteful materials as much as possible.
  - The materials and products will be recycled if applicable.
  - Good management and control practice will be applied.
- Proper segregation of waste at source will be implemented for efficient and effective in managing waste and to reduce the quantity of waste requiring treatment prior to final disposal and ultimately reduces the cost of waste treatment/management.
  - Segregation involves putting different classes of wastes into separate and appropriate temporary storage color-coded containers/bags as recommended by the national legislation to allow segregation and collection at the point of generation.
  - Colour coding is done by using colours to differentiate waste classes from one other. Colour coding is one of the efficient ways of achieving segregation of waste and for sorting out items such as paper, plastic, glass and metal for recycling.
  - The packaging would be appropriate for the type of waste involved.
  - All waste bags or containers would be labelled. Basic label information would include type of waste in the container, date of collection and, warning of hazardous nature. Labelling is important to identify the source of the waste or date of generation in case of an accident or improper segregation of the waste, to ensure that the workers responsible for waste management handle the different types of wastes safely.
  - Municipal waste will be separately collected at source (recyclable and nonrecyclable waste). Hence the recyclable portion of the waste (packaging waste) will be separately collected at source, waste load in the waste storage area would be decreased by implementing efficient waste separation methods at source.
- Monitoring: Regular visual inspection/audits for waste management strategies will be performed and audit mechanism will be integrated in the management plans.
  - All waste storage collection and storage areas will be inspected for evidence of accidental releases and to verify that wastes are properly labelled and stored.
  - Regular audits of waste segregation and collection practices will be conducted.
- Recording:

  - Waste generation trends by type and amount of waste generated will be tracked
  - The records of document including amount of waste generated and its destination will be kept.
- The disposal of end-of-life waste oils within the scope of the Project will be conducted in licensed disposal facilities. Additionally, waste oils and solid wastes contaminated with hazardous substances will be sent to licensed hazardous waste disposal facilities for proper disposal. The transportation of waste oils to disposal facilities will be carried out using licensed carriers.
- The Wastewater Management Plan will be established and implemented to guide and support the management of domestic onsite wastewater (septic tank) protecting the personnel health and the environment by properly treating wastewater before discharged it to the local WWTPs managed by the municipalities.
- All activities undertaken will adhere to relevant legislation and comply with the applicable national legislation specified in Section 11.2.1 of this Report.

11.6 Residual Impacts

- Residual impacts are those that remain after mitigation and/or enhancement measures have been implemented. A summary of impacts is presented below in Table **11.7** . Although the likelihood of the impacts will greatly be reduced with the application of mitigation, sensitivity of the receptors does not change.
- However, the application of mitigation including best practice measures means that the impact associated with the waste and resource management of the Project is reduced to negligible.
- As this mitigation would remove the likely risk of runoff from the exposed soil and concrete stockpiles occurring that could affect water resources, any major spillages would be considered an emergency which would require implementation of the emergency spill response plan.

There should be no residual significant effects of waste and resources after the implementation of appropriate mitigation measures.

Table 11.7: Summary of Residual Effects, After the Application of Mitigation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Soil Contamination due to poor waste management	Lands with Class VII & VIII LUC	Minor	Negligible
Life and Fire Safety vulnerability due to not properly stored waste	Forest Area	Moderate	Negligible
Poor management of high-volume excavation waste due to insufficient storage conditions onsite and offsite.	Existing local excavated soil disposal waste disposal areas and the Project area	Moderate to High	Negligible
Increase in load on the capacity of existing waste recycling/landfilling facilities	Existing local waste disposal facilities including landfills, waste transfer stations	Minor	Negligible
Runoff from the exposed soil and concrete stockpiles	Surface water bodies	Moderate	Negligible
Groundwater contamination due to poor waste management	Groundwater	Minor	Negligible
Increase in the load on the capacity of the existing wastewater treatment plants	Existing local wastewater treatment plants	Negligible	Negligible

12 Biodiversity

12.1 Introduction

This chapter presents the biodiversity baseline conditions and assessment of potential project impacts on biodiversity, biodiversity risks and impacts pertaining to construction and operation phases and presents high level monitoring and management actions. A standalone Critical Habitat Assessment and Biodiversity Management Plan were prepared with the information presented in this chapter. Project Company conducted studies on the flora and fauna in order to determine the current field conditions of the Project Area in 2024 in addition to the National EIA Ecological Reports. This chapter is based on Consultant's field reconnaissance survey, National EIA, 2024 biodiversity survey reports, national and international databases as outlined in the sections below.

12.2 Methodology

12.2.1 Applicable Guidelines and Standards

12.2.1.1 National Requirements

The primary framework of the Turkish legislation for environmental legislation is the Environmental Law (Law No: 2872). National laws and regulations regarding protection of the habitats and species are listed in Table 12.1.

Table 12.1: National Legislation on Biodiversity

Legislation (Official Gazette Date/Number - Last Revision Date)	National Strategy Documents
Law on National Parks (11.08.1983/18132 - 09.07.2018) Terrestrial Hunting Law (11.07.2003/25165 - 28.10.2020) Law on Animal Protection (01.07.2004/25509 - 13.12.2010) Regulation on the Protection of Wetlands (04.04.2014/28962 - 23.06.2022) Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (27.12.2001/24623 - 20.07.2019) Regulation on Protection of Wildlife and Wildlife Development Areas (08.11.2004/25637) Law on Protection of Cultural and Natural Assets (23.07.1983/18113 - 15.06.2022) Regulation on Collection, Protection and Usage of Plant Genetic Resources (19.07.2012/28358) Law on Fisheries (04.04.1971/ 13799 - 17.02.2021) The Environmental Protection Agency for Special Areas (08.07.2011/ 27988) Environment Law (11.08.1983 / 18132 - 15.06.2022) Forestry Law (08.09.1956 / 9402 - 25.12.2021) Law on Pasture (28.02.1998 / 23272 - 18.01.2019) Law on Coastal Areas Management (17.04.1990 / 20495 - 28.10.2020)	National Plan on on-site Protection of Plant Genetic Diversity (1998) National Environmental Action Plan (1999) National Forestry Program (2004) Climate Change Action Plan (2012) Turkish National Action Plan against Desertification (2015) National Rural Development Strategy (2015) National Biological Diversity Strategy and Action Plan (2019)

12.2.1.2 International Requirements

International agreements, conventions, and protocols regarding protection of the habitats and species are listed below:

- The Convention on the Conservation of European Wildlife and Natural Habitats (BERN) (1984)
- The Convention on Biological Diversity (1992)
- United Nations Framework Convention on Climate Change (1994)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) and Agreement (bird and mammals and their habitats, 1994)
- The Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR) (1994)
- The UN Convention on Biological Diversity (1997) and Cartagena Protocol on Biosafety (2004)
- Kyoto Protocol (2009)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996)
- Paris Agreement (2016)
- EIA Directive (EIA Directive 2014/52/EU on the assessment of the effects of certain plans and programs on the environment) (The Birds Directive (2009/147/EC), The Habitats Directive (92/43/EEC10)
- Waste Framework Directive (Directive 2008/98/EC on Waste)
- International Union for Conservation of Nature (IUCN) Red List of Threatened Species

12.2.1.3 Project Standards

The Project is seeking to be funded by EBRD. The Project Company intends to develop the Project in aliment with the policy and requirements of the Lenders (i.e., EP IV, IFC and EBRD standards).

The international lender standards concerning biodiversity for the Project are represented by the IFC Performance Standards (PS6) and related Guidance Notes (6), EBRD Performance Requirements (PR6) and Guidance Notes (6) as well as Equator principles IV (EP IV).

The impact assessment and critical habitat assessment are carried out in accordance with the following international requirements:

- IFC Performance Standards on Environmental and Social Sustainability,
- EBRD's Environmental and Social Policy and Performance Requirements
- International Union for Conservation of Nature (IUCN) Red List of Threatened Species
- The Birds Directive (2009/147/EC)
- The Habitats Directive (92/43/EEC10)
- Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries - Good Practice Handbook (2023)

The IFC PS6 objectives can be listed as:

- To protect and conserve biodiversity,
- To maintain the benefits from ecosystem services,
- To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

The EBRD PR6 objectives are as defined below:

- Protect and conserve biodiversity using a precautionary approach,

- Adopt the mitigation hierarchy in the design and implementation of projects with the aim of achieving no net loss, and where appropriate, a net gain of biodiversity,
- Maintain ecosystem services, and
- Promote good international practice in the sustainable management and use of living natural resources.

12.2.2 Study Area and Area of Influence

The Project Company will construct and operate the Project. The Project consists of 14 turbines, a switchyard, an administrative building, Project roads (i.e., access and site roads), as well as an ETL.

The investigation into the region's ecology was carried out to define an "Ecologically Appropriate Area of Analysis" (EAAA), to determine the presence of features that may qualify for Critical Habitat. The EAAA was identified at a scale indirect area of influence of the Project area, considering large-scale ecological processes. This approach ensures that all potential risks within the Project footprint and surrounding vicinity are taken into consideration. The EAAA will be presented within the stand-alone CHA prepared for the Project.

For the purposes of this Draft ESIA, the AoI for flora and terrestrial fauna species was defined as extending 2 km out from the Project footprint (turbines and roads); and 15 km for avifauna (bird and bats). Project AoI is shown on Figure 12.1.

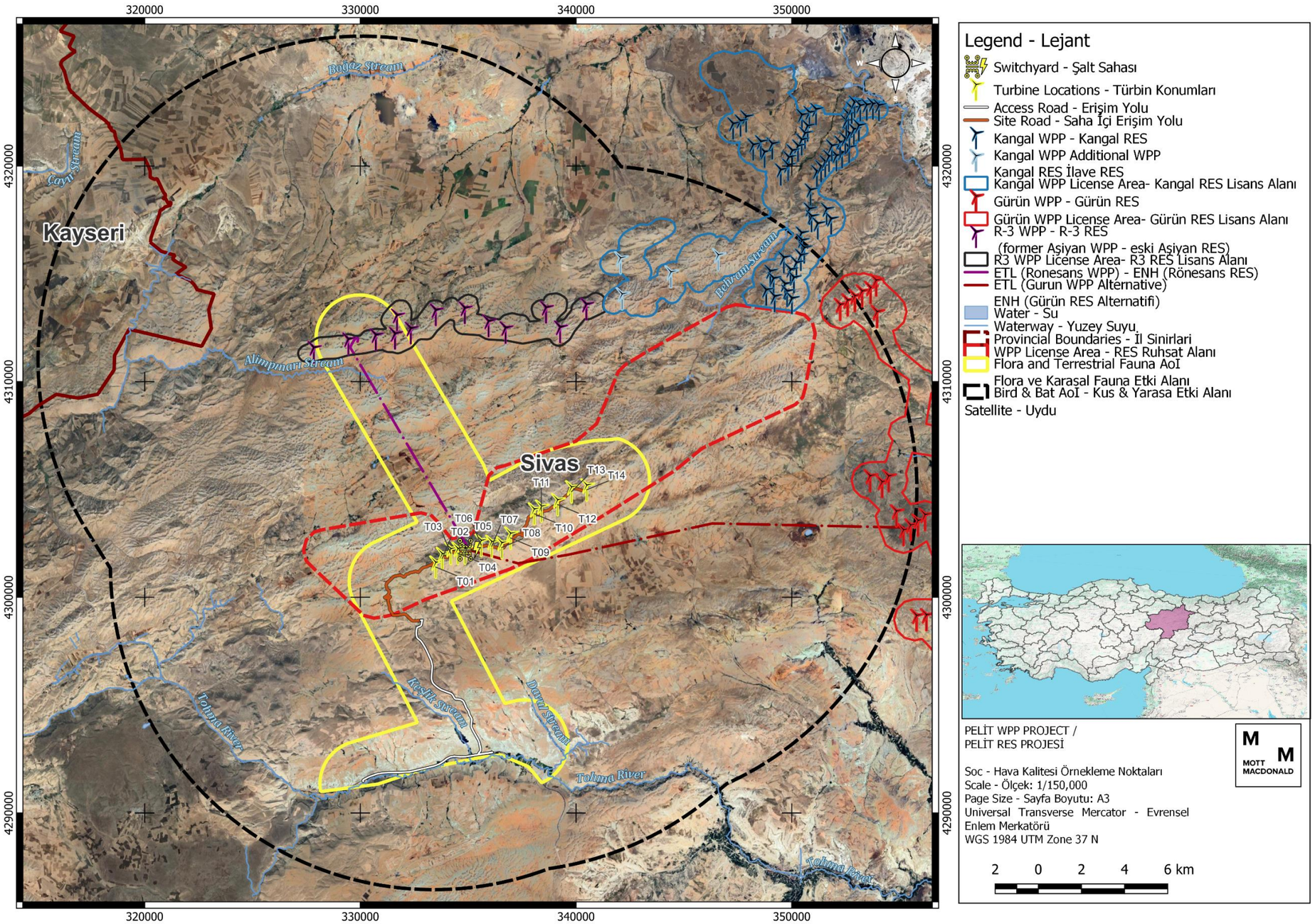


Figure 12.1: The Project AoI for different biological taxa.

12.2.3 Limitations and Assumptions

The consultant undertakes the ESIA study given the following important caveat and limitation:

- **Baseline collection**: Baseline Vantage Point bird surveys in 2024, while very informative, fall short of the minimum required effort duration (36 hours per Vantage Point) in spring and summer seasons (24 hours per VP for each season). ETL survey effort is restricted to 12 hours per VP in spring and summer seasons and 24 hours in autumn which is also below minimum requirements for robust baseline collection which introduces uncertainties into this ESIA assessment due to scarcity of publications and citizen science data from the region.

12.2.4 Baseline Collection Methodology

The baseline collection methodology of this Draft ESIA relies primarily on desktop components, such as technical reports and assessments prepared for the Project, along with white and grey literature, which are detailed below. The Consultant conducted a brief site reconnaissance visit as well. Flora and fauna studies conducted in spring and summer 2024 were also included.

12.2.4.1 Desktop Study

An exhaustive desktop review of the study area comprises the major component of the present Biodiversity study. The desktop component was performed perusing the following:

- National EIA for Pelit WPP (2018)
  - Ecosystem Assessment Report for Pelit WPP
- National EIA for Kangal WPP Capacity Increase (2023)
- Pelit WPP Bird and Bat Activity Surveys Baseline Study Report (2023)
- Pelit WPP Bird and Bat Activity Surveys Baseline Study Report (2024)
- Pelit WPP Fauna Surveys Baseline Study Report (2024)
- Pelit WPP Habitat and Flora Study Report (2024)
- Relevant publicly available peer-reviewed literature
- White and grey literature, including unpublished technical reports of nearby WPPs
- Public biodiversity databases, primarily including but not limited to,
  - eBird[119],
  - European Breeding Bird Atlas[120]
  - iNaturalist[121],
  - Tramem[122],
  - Trakus[123],
  - AdaMerOs Herptil Turkiye[124]
  - Movebank[125]
  - Global Invasive species database[126]

[119] Retrieved April 1, 2024, from Ebird.org.
[120] Retrieved April 1, 2024, from ebba2.info
[121] Retrieved April 1, 2024, from Inaturalist.org.
[122] Retrieved April 1, 2024, from Tramem.org.
[123] Retrieved April 1, 2024, from Trakus.org.
[124] Retrieved April 1, 2024, from turkherptil.org.
[125] Retrieved April 1, 2024, from movebank.org.
[126] Retrieved April 1, 2024, from iucngisd.org.

  - Bizimbitkiler[127]
- Satellite imagery and maps
- BirdLife International Soaring Bird Sensitivity Mapping Tool v3[128]
- Opinions of local biodiversity experts (formal / informal)
- Internationally recognized areas
  - Key Biodiversity Areas
  - Important Bird Areas
- IUCN Red List
- Nationally threatened species
- BERN convention and appendices
- EU Habitats Directive
  - Annex I habitats
  - Annex II/IV species

12.2.4.2 Field Surveys

Given the limited timescale, it was not possible to undertake the biodiversity baseline surveys during appropriate season before the completion of the Draft ESIA study. It was possible to conduct a brief site visit (one day) which can be described as a site reconnaissance visit.

On 22-23 January 2024, the Project area was partially visited by Mott MacDonald. The Project area and the existing WPP components were visited, but snow cover limited the site visit significantly.

If some features were not observed by the Consultant during this visit, it does not necessarily indicate such features are not present and/or abundant.

12.2.4.3 Supplementary Baseline Collection

As discussed further in baseline sections for each species group, the biodiversity data was identified to have some gaps. The last flora survey conducted during the ecologically appropriate season belongs to the National EIA and was found to be out of date; thus, additional flora studies was conducted on July 31th 2024. Similarly, the terrestrial fauna survey was outdated. In order to provide up-to-date data, a terrestrial fauna study was conducted in the spring and summer of 2024. Autumn 2023 baseline was available for birds, so a spring, summer and autumn study was conducted in 2024. Bat baseline was not available at all which was provided by the field survey carried out in spring, summer and autumn 2024.

To address these data gaps, additional baseline was accomplished as follows:

The following field surveys were being carried out for bird and bat studies:

- Baseline Bird Surveys
  - Vantage Point Surveys for turbines
  - Vantage Point Surveys for ETL
  - Breeding Bird Surveys (Breeding bird surveys will follow the methodology of the European Breeding Bird Atlas 2- A minimum of 3 transect of 2 hours/1 km)
  - Nesting Raptor Surveys (within 2 km of turbines)

[127] Retrieved April 1, 2024, from Bizimbitkiler.org.tr.

[128] Retrieved May 1, 2024, from maps.birdlife.org/msbtool/

- Baseline Bat Surveys
  - Acoustic Bat Surveys (Following EUROBATS)
  - Survey period every month between March and October
  - Observation stations:
    - A total of four static detectors
    - One mobile detector used on the car driven transects
  - Survey duration:
    - Two consecutive nights for static detectors, two consecutive nights Mobile surveys between 8pm and 12am at night once a month.
- Supplementary terrestrial fauna surveys were conducted in ecologically appropriate season in 2024
  - The methodology involved interviews with local people, direct observation via transect walks, sign and track analysis, Sherman trapping and camera trapping.
  - 26 study points were selected for terrestrial fauna. Study design includes new turbine locations
  - Sherman trapping and camera trapping were accomplished.
  - Surveys covered April – June in 2024.

- Supplementary flora surveys were conducted in ecologically appropriate season in 2024.
  - The field research was done in the areas surrounding the ETL route, the roads that are intended to be opened, the turbine locations that were directly impacted by the Project.
  - The field survey was conducted in transect 500 x 500 meters in identified 26 study points.
  - Plants collected from the Project area was determined using the "Flora of Turkey and East Aegean Islands". While determining the danger categories of endemic plants, “The Red Book of Plants of Turkey" prepared by Tuna Ekim and his colleagues was used as the main reference work.
  - The distribution coordinates of local and regionally distributed endemic species and population ratios was determined in the Project area.

Figure 12.2 illustrates the study points for supplementary flora baseline.

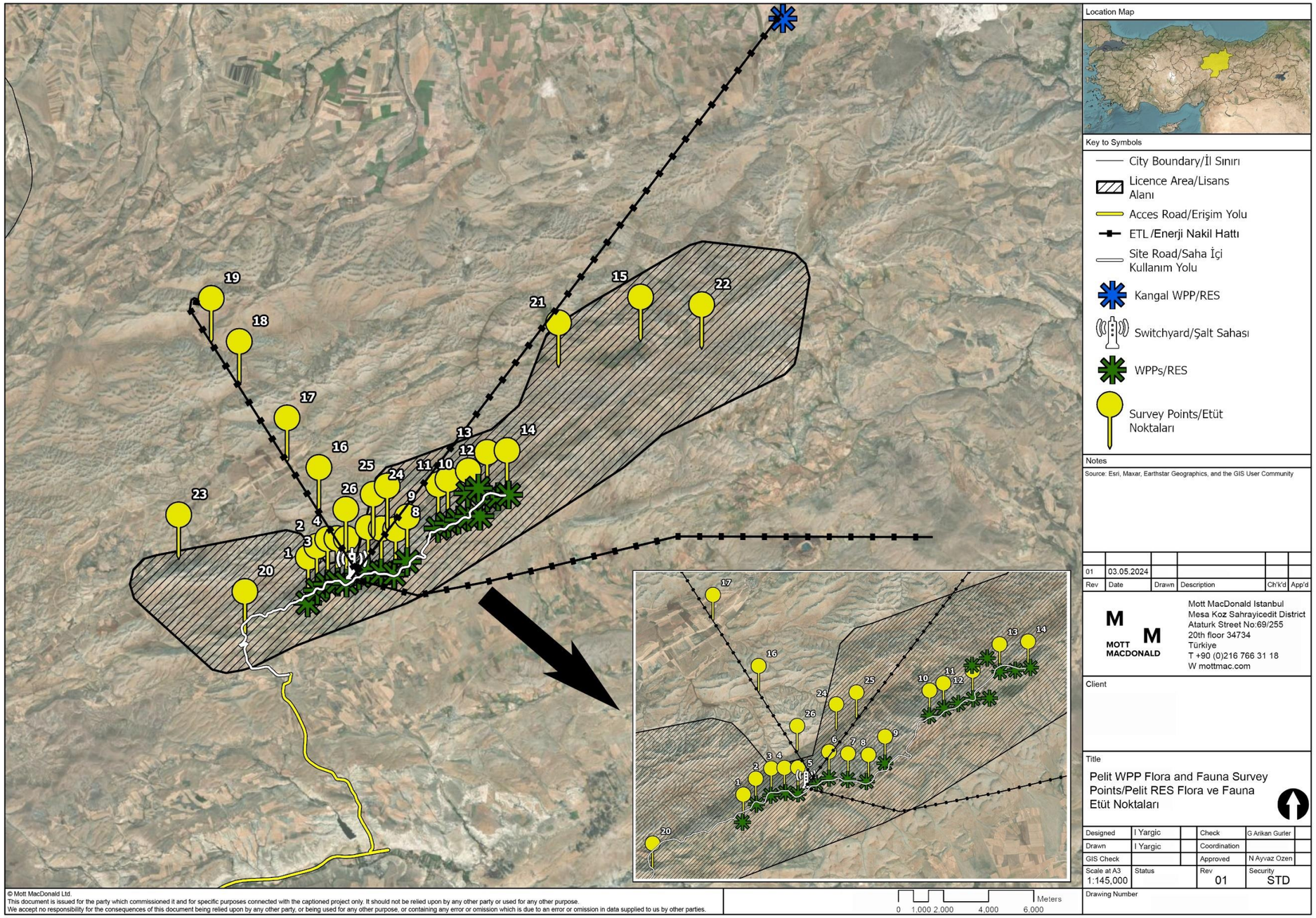


Figure 12.2: Supplementary flora and terrestrial fauna baseline study points

12.2.5 Determining, Magnitude and Significance for Biodiversity

Table 12.2: Criteria for Determining Receptor Sensitivity (conservation importance)

Conservation Importance (Sensitivity)	Detail	Species Criteria	Habitat or Site Criteria
High	Very high or high conservation importance and rarity, international and/or national scale, or regional scale with limited potential for substitution.	Critically Endangered and Endangered species listed by IUCN. Restricted range species (IUCN classification). Migratory species likely to trigger Critical Habitat (>1% of the global population) Annex IV species designated in the EU Habitats Directive	Internationally recognised areas (IFC PS6 definition) and nationally designated sites in IUCN categories I and II. All areas of potential Critical Habitat (IFC PS6 definition). Natural Habitats of international and/or national conservation importance and/or high biodiversity, with limited potential for substitution. Annex I priority habitats designated in the EU Habitats Directive
Medium	Medium conservation importance and rarity, regional scale with good potential for substitution.	Vulnerable species listed by IUCN. Nationally protected species or rare species. Endemic species. Migratory species that do not trigger Critical Habitat (<1% of the global population) Annex II species designated in the EU Habitats Directive	Nationally designated sites in IUCN categories III-VI or with no equivalent IUCN category. Regionally important Natural Habitats. Natural Habitats which do not classify as Critical Habitat. Endemic Bird Areas (EBAs) Annex I habitats (non-priority) habitats designated in the EU Habitats Directive
Low	Low conservation importance, local scale.	IUCN Near Threatened and Least Concern species. Species of no national importance (threat and/or protection).	Sites designated at local level (no IUCN category). Undesignated sites and Natural Habitats of some local biodiversity and cultural heritage interest. Modified Habitats with limited biodiversity value. Artificial and converted habitats (e.g artificial water bodies, plantations, agricultural crops).
Negligible	Very limited ecological importance.	N/A	Hardstanding, bare ground and buildings.

The magnitude of the potential impacts upon each ecological feature is assessed for the construction and operation of the Project using criteria in Table 12.3.

Table 12.3: Criteria for Determining Magnitude

Category	Description (adverse impacts)
Major	Fundamental change to the specific conditions assessed resulting in long term or permanent change, typically widespread in nature and requiring significant intervention to return to baseline; would violate national standards or Good International Industry Practice (GIIP) without mitigation.
Moderate	Detectable change to the specific conditions assessed resulting in non-fundamental temporary or permanent change.
Minor	Detectable but minor change to the specific conditions assessed.
Negligible	No perceptible change to the specific conditions assessed.

The significance of biodiversity impacts is determined through consideration of conservation importance (sensitivity) of Project affected biodiversity features (biodiversity receptors), and the magnitude of the impact experienced by them. The significance matrix on Table 12.4 is used to assess the construction and operation phases of the Project.

Table 12.4: Criteria for determining impact

		Magnitude						
		Adverse			Neutral	Beneficial		
		Major	Moderate	Minor	Negligible	Minor	Moderate	Major
Sensitivity	High	Major	Major	Moderate	Negligible	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
	Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

12.3 Baseline Conditions

12.3.1 Nationally Protected and Internationally Recognized Areas

The Project AoI does not overlap any nationally protected or internationally recognized areas. The closest nationally protected area is Ulas Lake which is also an internationally recognized area due to its Key Biodiversity Area (KBA) designation. Ulas Lake protected area boundaries are located 30 km away from the Project AoI. Kulmac Mountain KBA is roughly 20 km away. Additionally, Binboga Mountains KBA boundary is also 30 km away from the Project AoI. Both areas are located a considerable distance from the Project.

Very importantly, Türkiye's KBA inventory is being re-evaluated for a long due overhaul by a team of experts led by BirdLife Türkiye at the time of writing this Draft ESIA. The revised KBA inventory is expected to be published late 2024.

12.3.2 Habitats and Flora

The Project AoI mainly consists of steppe and rocky habitats with low level of anthropogenic influence. A couple of small streams are present. Some modified habitats are present as well such as agricultural fields, residential areas, modified streams and a water reservoir.

Majority of the access road traverses existing unpaved roads through a mixture of natural and modified agricultural habitats, and will need to be widened, or new road constructed at parts. The site roads and turbines are mainly situated on natural steppe and rocky habitats. The ETL similarly traverses natural steppe and rock habitats due southwest and agricultural fields due northeast. Habitat types of the project are detailed in Table 12.5 and shown on Figure 12.3.

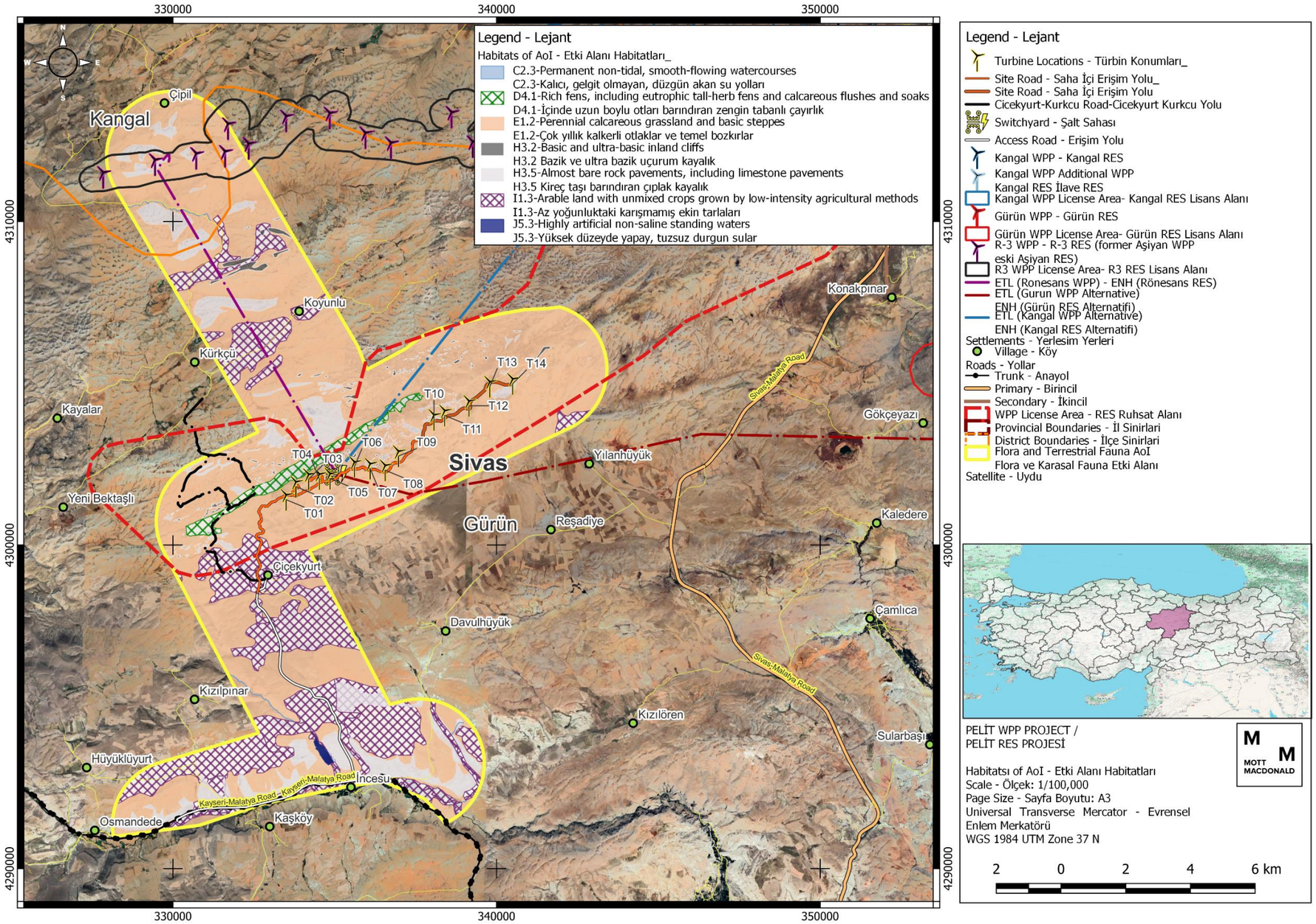


Figure 12.3: EUNIS Habitat Classification of the Project AoI

Table 12.5: EUNIS Habitat Classification of the Project AoI.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	11.71	0.08%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	239.84	1.61%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	9,895.37	66.42%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	103.31	0.69%
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	1,575.60	10.58%
Agricultural Fields	I1.3- Unmixed crop fields of low density	3,050.72	20.48%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	20.81	0.14%
Total		14,897.36	100.000%

Habitats lost directly due to the Project footprint was calculated for each Project component (turbine footprint, ETL, alternative ETL, access and site roads) and shown in Table 12.6 - Table 12.10. The amount of habitat loss to the Project footprint is considered low and no trees will be cut for construction.

Table 12.6: Habitat loss from the turbine footprint.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	0.00	0.00%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	0.00	0.00%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	7.44	0.08%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	0.00	0.00%
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	1.32	0.08%
Agricultural Fields	I1.3- Unmixed crop fields of low density	0.00	0.00%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	-	-
Total		8.76	0.16%

Table 12.7: Habitat loss from the site roads.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	0.00	0.000%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	0.00	0.000%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	24.89	0.25%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	0.00	0.000%
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	0.39	0.02%
Agricultural Fields	I1.3- Unmixed crop fields of low density	1.46	0.05%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	0	0.000%
Total		26.74	0.32%

Table 12.8: Habitat loss from the access roads.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	0.00	0.00%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	0.00	0.00%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	5.23	0.05%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	0.00	0.00%
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	1.39	0.09%
Agricultural Fields	I1.3- Unmixed crop fields of low density	10.65	0.35%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	0	0.000%
Total		17.27	0.49%

Table 12.9: Habitat loss from the ETL.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	0.00	0.00%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	0.60	0.25%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	13.51	0.14%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	0.07	0.07%

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	5.25	0.33%
Agricultural Fields	I1.3- Unmixed crop fields of low density	4.06	0.13%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	0	0.000%
Total		23.48	0.92%

Table 12.10: Habitat loss from the switchyard.

Broad habitat type	EUNIS Habitat Type	Extend within Project AoI (ha)	Percentage (%)
Inland surface waters	C2.3-Permanent non-tidal, smooth-flowing watercourses	0.00	0.00%
Mire, Bog and Fen Habitats	D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks	0.00	0.00%
Steppe	E1.2-Perennial calcareous grassland and basic steppes	0.28	0.0028%
Inland unvegetated or sparsely vegetated habitats	H3.2- Basic and ultra basic cliff rock	0.00	0.00%
Inland unvegetated or sparsely vegetated habitats	H3.5- Almost bare rock pavements, including limestone pavements	0.00	0.00%
Agricultural Fields	I1.3- Unmixed crop fields of low density	0.00	0.00%
Built-up Areas	J5.3-Highly artificial non-saline standing waters	-	-
Total		0.28	0.0028%

In line with the results of the previous flora studies, the most recent flora study was carried out by the expert Hayri Duman on 31 July 2024 for WPP Capacity Increase and the results were in parallel with the previous studies (Table 12.11).

As part of the National EIA studies in 2017, flora surveys were conducted in December 2017 during a two-day field study. It should be noted that due to the elevation and climate of the region, winter weather conditions are harsh, hence the study season does not constitute an ecologically appropriate season for flora species. Additionally, the study was conducted according to a former turbine configuration, which was revised later, and the study does not cover roads or the ETL route.

On 31 July 2024, an updated flora study was conducted. During the flora surveys, a total of 292 species belonging 46 families were identified (presumably via desktop components) and 60 of these species are endemic. Of these endemics, 12 are regional and 48 are widely distributed endemics. The list of endemic species includes seven Near Threatened (NT), eight Vulnerable (VU), three Endangered (EN) and one Critical (CR) species (Table 12.11). The Project's location on the Anatolian Diagonal gives rise to high level of endemism in the region, which aligns with the baseline observations of numerous endemics.

Table 12.11: List of endemic species identified for the Project in 2024 Flora Baseline Report

Scientific Name	National Red List
Allium yamadagense	CR
Asyneuma davisianum	EN
Silene caryophylloides subsp. binbogaensis	EN
Astragalus stridii	EN
Campanula pinnatifida var. pinnatifida	VU
Minuartia dianthifolia subsp. cataonica	VU
Minuartia rimarum var. multiflora	VU
Astragalus dumanii	VU
Paronychia cataonica	VU
Thymus cappadocicu	VU
Thesium aureum	VU
Hyacinhella acutiloba	VU
Aethionema caespitosum	NT
Aurinia rupestris subsp. cyclocarpa	NT
Minuartia corymbulosa var. corymbulosa	NT
Phryna ortegioides	NT
Astragalus haussknechtii	NT
Acantholimon kotschyi	NT
Galium cornigerum	NT
Prangos meliocarpoides var. *meliocarpoides*	LC
Nonea stenosolen	LC
Gypsophila laricina	LC
Centaurea drabifolia subsp. *cappadocica*	LC
Convolvulus assyricus	LC
Astragalus condensatus	LC
Peucadanum palimbioides	LC
Alyssum lepidotum	LC
Erysimum thyrsoideum	LC
Minuartia erythrosepala var. *cappadocica*	LC
Silene nuncupanda	LC
Achillea lycaonica	LC
Centaurea armena	LC
Centaurea mucronifera	LC
Centaurea laniger	LC
Helichrysum arenarium subsp. *rubicundum*	LC
Helichrysum chionophilum	LC
Cousinia eriocephala	LC

Scientific Name	National Red List
Scorzonera tomentosa	LC
Tanacetum cadmeum subsp. *orientale*	LC
Tanacetum argenteum subsp. *argenteum*	LC
Pterocephalus pinardii	LC
Astragalus hirsutus	LC
Astragalus lamarckii	LC
Ebenus laguroides	LC
Hedysarum erythroleuucum	LC
Marrubium globosum subsp. *globosum*	LC
Micromeria cremnophila subsp. *anatolica*	LC
Phlomis capitata	LC
Phlomis linearis	LC
Salvia caespitosa	LC
Linaria corifolia	LC
Alopecurus lanatus	LC
Elymus lazicus subsp. *divaricatus*	LC
Irıs stenophylla subsp. *tauri*	LC
Iris schachtii	LC
Allium sivasicum	LC
Bellevalis gracilis	LC
Fritillaria aurea	LC
Muscari aucheri	LC
Muscari coeleste	LC

IUCN: CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient, NE: Not Evaluated.

12.3.3 Birds

The Project AoI is not located on or near a major or minor migratory flyway of large soaring bird species. Since there are multiple major and minor flyways across Anatolia, scattered and sporadic migrant activity in small numbers is possible, however significant activity levels is not indicated for the Project AoI. Migratory activity, if any, would be more likely channelled through Uzunyayla Plateau due north since following flatter terrain, rather than crossing mountain terrain, would be more energy efficient. Scientific studies or citizen science observations from the region are sparse, however an ornithological study was conducted for Kangal WPP Extension National EIA in 2023 encompassing 25 days in autumn season, and migration of +700 individuals of White Stork (*Ciconia ciconia)* was recorded.

Since the Project is located on the Anatolian diagonal, it has certain climate and habitat features that affect bird activity. This is a region characterized by montane terrain interspersed with high plateaus. Winters are harsh and snow covers the ground for extended periods. Following the snowmelt in spring, in April-May, ecological productivity is high. Agricultural grazing and dry season conditions diminish the vegetation in the summer and biomass is greatly removed by autumn. This fluctuation in environmental parameters and availability of food and prey species would characterize bird activity in the region for the most part.

The Project AoI also does not overlap any significant standing or running freshwater features which might attract waterbirds. The artificial reservoir is small and under anthropogenic pressure such as disturbance and hunting to provide good opportunities for waterbirds. Additionally, there are larger and more permanent, and protected water features outside of the Project AoI which would present better opportunities for these species.

The Project AoI, however, with the vast open steppe habitats, the cliffs and rocks, the low level of anthropogenic pressure, and the availability of agricultural land within which might attract prey species, can be considered to provide suitable habitat for breeding raptors. According to EBBA, these might include Egyptian Vulture (*Neophron percnopterus*) (EN), Short-toed Snake Eagle (*Circaetus gallicus*), Booted Eagle (*Hieraaetus pennatus*), Golden Eagle (*Aquila chyrsaetos*), Eurasian Marsh-harrier (*Circus aeruginosus*), Long-legged buzzard (*Buteo reufinus*), Common Buzzard (*Buteo buteo*), Common Crane (*Grus grus),* Eurasian Kestrel (*Falco tinnunculus*), Eurasian Hobby (*Falco subbuteo*) and Saker Falcon (*Falco cherrug*) (EN) (public records obfuscated for conservation). Egyptian Vulture is expected to be active at the site both as a breeding species and also from nearby populations which are roaming outside of the breeding frame. A study conducted with Egyptian Vultures GPS tagged at Igdir province shows that the species can cover 750 km between favoured summer and winter ranges. The study also includes dataset which demonstrates GPS tracks from the Project AoI shown on Figure 12.4.

Additionally, eBird records from winter indicate that the Project AoI might overlap non-breeding ranges of Great Bustard (*Otis tarda*) (EN). The species is both a long-range and facultative migrant. Potential breeding populations are indicated from Todurge Lake approximately 100 km due north of Project AoI. The species might be attracted to the agricultural fields in and near the Project AoI based on environmental parameters.

A list of significant bird species (large-bodied soaring species) is provided in Figure 12.4, along with observations during Project baseline studies.

Bird surveys including migration observations and ETL observations were carried out and reported in autumn 2023, and spring, summer and autumn seasons in 2024.

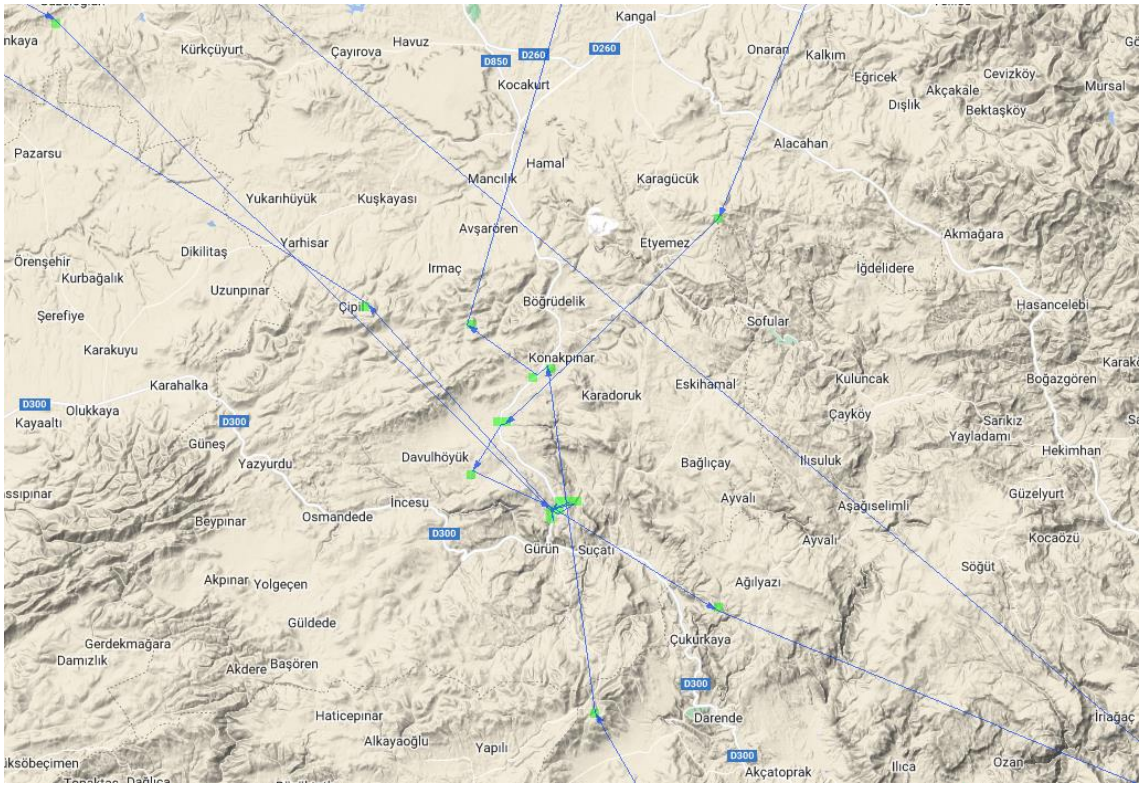


Figure 12.4: GPS tracked Egyptian Vulture within Project AoI.[129]

Table 12.12: List of significant bird species and whether they were observed in Project biodiversity baseline studies[130]

English name	Scientific name	IUCN	National	Bird directive	BERN	L/O
Levant Sparrowhawk	*Accipiter brevipes*	LC	VU	I	II	L
Northern Goshawk	*Accipiter gentilis*	LC	NT	-	II	L
Eurasian Sparrowhawk	*Accipiter nisus*	LC	NT	-	II	O
Cinereous Vulture	*Aegypius monachus*	NT	EN	I	II	L
Golden Eagle	*Aquila chrysaetos*	LC	-	I	II	O
Imperial Eagle	*Aquila heliaca*	VU	EN	I	II	L
Steppe Eagle	*Aquila nipalensis*	EN	CR	I	II	L
Eurasian Eagle-Owl	*Bubo bubo*	LC	-	I	II	L
Common Buzzard	*Buteo buteo*	LC	-	-	II	O
Rough-legged Hawk	*Buteo lagopus*	LC	-	-	II	L
Long-legged Buzzard	*Buteo rufinus*	LC	NT	I	II	O
White Stork	*Ciconia ciconia*	LC	-	I	II	L
Black Stork	*Ciconia nigra*	LC	-	I	II	O
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	VU	I	II	O
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	NT	I	II	O

[129] URL: movebank.org. Last accessed 1 April 2024

[130] Pelit WPP Bird and Bat Activity Surveys Baseline Study Report (2023)

English name	Scientific name	IUCN	National	Bird directive	BERN	L/O
Hen Harrier	*Circus cyaneus*	LC	DD	I	II	L
Pallid Harrier	*Circus macrourus*	NT	CR	I	II	L
Montagu's Harrier	*Circus pygargus*	LC	EN	I	II	L
Greater Spotted Eagle	*Clanga clanga*	VU	VU	I	II	L
Lesser Spotted Eagle	*Clanga pomarina*	LC	EN	I	II	L
Lanner Falcon	*Falco biarmicus*	LC	VU	I	II	L
Saker Falcon	*Falco cherrug*	EN	CR	I	II	L
Merlin	*Falco columbarius*	LC	-	I	II	L
Eleonora's Falcon	*Falco eleonorae*	LC	EN	I	II	L
Lesser Kestrel	*Falco naumanni*	LC	VU	I	II	L
Peregrine Falcon	*Falco peregrinus*	LC	VU	I	II	L
Eurasian Hobby	*Falco subbuteo*	LC	-	-	II	L
Eurasian Kestrel	*Falco tinnunculus*	LC	-	-	II	O
Red-footed Falcon	*Falco vespertinus*	VU	-	I	II	O
Bearded Vulture	*Gypaetus barbatus*	NT	EN	I	II	L
Eurasian Griffon	*Gyps fulvus*	LC	EN	I	II	L
White-tailed Eagle	*Haliaeetus albicilla*	LC	CR	I	II	L
Booted Eagle	*Hieraaetus pennatus*	LC	VU	I	II	O
Black Kite	*Milvus migrans*	LC	EN	I	II	L
Red Kite	*Milvus milvus*	LC	DD	I	II	L
Egyptian Vulture	*Neophron percnopterus*	EN	VU	I	II	O
Great Bustard	*Otis tarda*	EN	EN	I	II	L
Osprey	*Pandion haliaetus*	LC	DD	I	II	L
European Honey-buzzard	*Pernis apivorus*	LC	NT	I	II	O

12.3.3.1 Vantage Point Surveys

Surveys were based on NatureScot Vantage Point methodology and included Collision Risk Modelling for both 2023 and 2024 baseline studies. Deficiencies in the application of NatureScot methodology, methodological differences between the seasons, and inadequate reporting is noted below:

- Number of VPs were changed between the seasons. While this is an inconsistency between the two studies, it is understood that the decision was made to increase visual coverage.
- In autumn 2023, the month of September was not sampled at all, with VP effort distributed between August and October.
- The collision risk for autumn was calculated according to 79 hr/VP, however 39.5 hr/VP was accomplished during VP surveys, constituting a major error source for modelling.
  - While this factor has a major impact on calculated Collision Risk, since the baseline activity and collision risk are low, it still results in low collision risk for the species in question.

- In spring 2024, the month of March was not sampled at all, however it is understood that the winter conditions in the region persist into end of March.
- As described in the limitations, baseline Vantage Point bird surveys in 2024, while very informative, fall short of the minimum required effort duration (36 hours per Vantage Point) in spring and summer seasons (24 hours per VP for each season) effecting collision risk estimation robustness. ETL survey effort is restricted to 12 hours per VP in spring and summer seasons and 24 hours in autumn which is also below minimum requirements for robust baseline collection which introduces uncertainties into this ESIA assessment due to scarcity of publications and citizen science data from the region.

Results of VP surveys are shown in Table 12.13. Bird activity in autumn was evaluated as low, potentially due to low ecological productivity of the region after extended dry season. Increased biomass after snowmelt in spring was expected to increase bird activity, however the level of activity and species diversity remained low. Some migratory activity in spring was observed at low levels. Egyptian Vulture (*Neophron percnopterus*) which is Endangered (EN) was observed to be consistently active during VP surveys as was expected from desktop components.

Table 12.13: VP survey results.

			Autumn 2024				Spring / Summer 2024				Autumn 2023		
Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total	Migrant	Resident	Unknown	Total	Migrant	Resident	Total
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	1	-	1	1	-	-	1	1	-	1
Unidentified raptor	*Accipitridae xx*	-	-	-	-	-	-	7	-	7	-	6	6
Golden Eagle	*Aquila chrysaetos*	LC	-	2	-	2	-	11	-	11	-	10	10
Common Buzzard	*Buteo buteo*	LC	-	5	-	5	2	2	-	4	2	2	4
Long-legged Buzzard	*Buteo rufinus*	LC	-	-	-	-	-	54	-	54	-	42	42
Black Stork	*Ciconia nigra*	LC	-	-	-	-	1	1	-	2	1	1	2
Short-toed Snake Eagle	*Circaetus gallicus*	LC	-	-	-	-	-	-	1	1	-	-	-
Eurasian Marsh Harrier	*Circus aeruginosus*	LC	-	-	-	-	2	7	-	9	2	7	9
Pallid Harrier	*Circus macroruus*	NT	1	-	-	1	-	-	-	-	-	-	-
Unidentified harrier	*Circus spec.*	-	-	-	-	-	-	1	-	1	-	1	1
Common Kestrel	*Falco tinnunculus*	LC	-	10	-	10	-	19	-	19	-	15	15
Red-footed Falcon	*Falco vespertinus*	VU	-	-	-	-	-	1	-	1	-	1	1
Booted Eagle	*Hieraaetus pennatus*	LC	-	-	-	-	-	2	-	2	-	2	2
Egyptian Vulture	*Neophron percnopterus*	**EN**	2	2	-	4	-	3	-	3	-	2	2
European Honey-buzzard	*Pernis apivorus*	LC	-	-	-	-	4	-	-	4	4	-	4

A summary table of collision risk estimations produced from the VP studies is shown on Table 12.14. Some significant estimations are,

- 10 years to fatal collision for Golden Eagle
- 6 years to fatal collision for Long Legged Buzzard
- 13 years to fatal collision for Common Kestrel

While large soaring species activity and collision risks are generally low with some species moderate since Egyptian Vulture (EN) was observed, and since bird activity can be highly variable across years, and since rare and threatened species are known both in literature and observation from the EAAA, high collision risk of specific species cannot be safely ruled out at this stage, which can only be accomplished after multiple year studies. Furthermore, certain species can be "attracted" and/or "habituated" to WPPs for several reasons post-construction, such as for nesting and perching opportunities provided by WPP structures (turbine tower and ETL pylons), or opportunities for feeding due to collision mortality of other bird and bat species. Therefore, pre-construction collision risk is not a complete indication of operation collision risk.

Table 12.14: Collision risk estimation for species in 2024.

			Autumn 2024			Spring / Summer 2024			Autumn 2023		
Common Name	Scientific Name	IUCN	Migrant	Resident	Total	Migrant	Resident	Total	Migrant	Resident	Total
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	-	-	0.01	0.00	0.01	-	-	-
Golden Eagle	*Aquila chrysaetos*	LC	-	0.02	0.02	-	0.05	0.05	-	0.06	0.06
Common Buzzard	*Buteo buteo*	LC	-	-	-	0.01	0.01	0.02	-	-	-
Long-legged Buzzard	*Buteo rufinus*	LC	-	0.02	0.02	-	0.13	0.13	-	0.04	0.04
Black Stork	*Ciconia nigra*	LC	-	-	-	0.01	0.00	0.01	-	-	-
Short-toed Snake Eagle	*Circaetus gallicus*	LC	-	-	-	-	0.00	-	-	-	-
Eurasian Marsh Harrier	*Circus aeruginosus*	LC	-	-	-	0.01	0.00	0.01	-	-	-
Common Kestrel	*Falco tinnunculus*	LC	-	0.01	0.01	-	0.06	0.06	-	0.02	0.02
Red-footed Falcon	*Falco vespertinus*	VU	-	-	-	-	0.00	-	-	-	-
European Honey-buzzard	*Pernis apivorus*	LC	-	-	-	0.01	0.00	0.01	-	-	-

While the 2024 VP study was able to capture and model most of the species of significance for the Project, some species were either not observed or were not observed at risk zone in the baseline, notably *Accipiter brevipes, Aquila nipalensis, Ciconia ciconia, Circus cyaneus, Circus macrourus, Circus pygargus, Falco biarmicus, Falco cherrug, Falco columbarius, Falco naumanni, Falco peregrinus, Gyps fulvus, Hieraaetus pennatus, Milvus migrans, Neophron percnopterus,* and *Otis tarda.* For the purposes of this ESIA study, it is safe to assume that the collision risk of these species is similar to those species which are rare yet captured in the VP study as shown on Table 12.14, however note also that the VP effort did not meet minimum requirement for the seasons. An additional approach to further collision risk estimating non-observed migratory route species are presented in Table **12.21** which summarises monitoring to be implemented for the Project.

12.3.3.2 ETL Surveys

ETL surveys were conducted during bird baseline studies in 2023 and 2024. The following deficiencies in the studies are noted:

- The ETL considered in the autumn studies is the alternative ETL design and the main ETL route was not assessed.
- Conversely in 2024, only the main route was studied, while the alternative ETL route was not, despite the autumn report concluding necessity for follow up regarding potential nesting sites of Egyptian Vulture.

- The ETL survey effort does not constitute sufficient baseline effort for tracking bird movement across the segments and is not representative of the entire season.

Based on the autumn 2023 studies, segment 3 is a potential nesting area for Egyptian Vulture (*Neophron percnopterus*) (EN) as good opportunities for nesting and two individuals present in the area were recorded. Segment 12 was also identified as potentially being significant for daily raptor movements in the area. While this ETL is no longer considered for the Project and is outside of scope, the area itself remains within the Project AoI for bird species and the information obtained regarding potential nesting sites of Egyptian Vultures is significant. Since the breeding bird methodology in spring 2024 involved transect walks at turbines, alternative ETL was not covered for breeding raptors, including Segment 3 where Egyptian Vulture presence was identified.

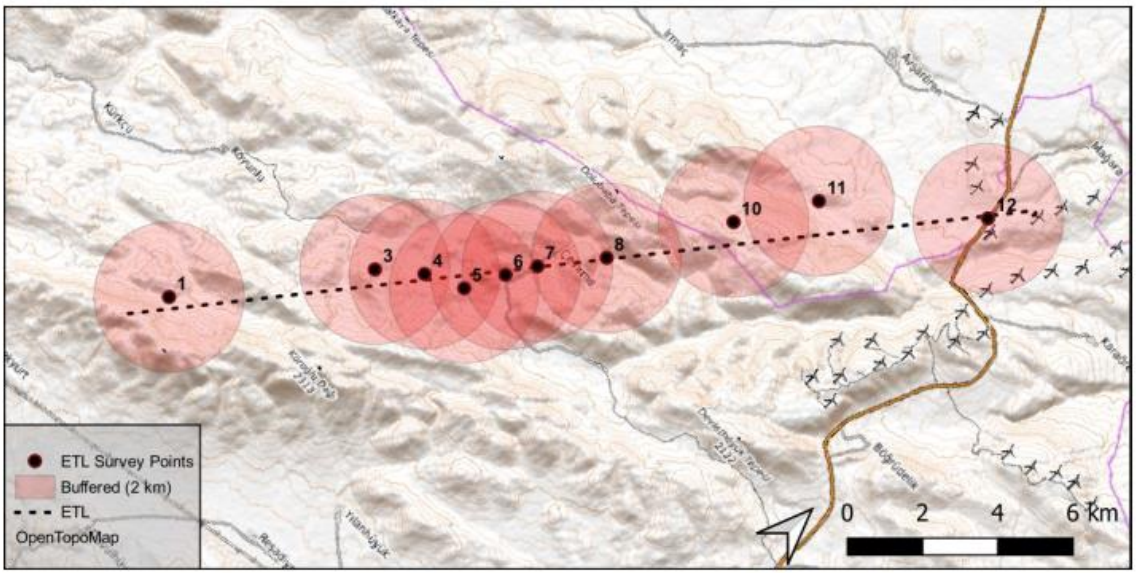


Figure 12.5: Alternative ETL survey points (autumn).

Based on the 2024 studies, Egyptian Vulture is active at risk height on the revised ETL route. The collision risk is essentially distributed throughout the ETL since the species has extremely wide territories and roaming ranges and cover long distances daily.

Overall, baseline regarding the ETL is not robust enough to further elucidate risks for threatened and rare raptors known in the Project AoI at this stage and the evidence at hand suggests high risk to priority and threatened target species.

12.3.3.3 Breeding Bird and Raptor Nesting Surveys

Breeding bird surveys consisted of monthly transect walks near selected turbines. It is not clear from the baseline report how many transects, covering which turbines were conducted. Furthermore, ETL or the alternate ETL route were not covered. Similarly, the scope of the breeding raptor survey is not clarified in the baseline report, however the discussion section makes it apparent that points of interest within the Project AoI were not studied, such as Tohma Canyon or Sivas Road junction, in addition to discovery visits for other currently unknown points of interest. Therefore, assessment of risks and potential impacts at the Project AoI level contains high levels of uncertainty. Nesting raptor activity of threatened species utilizing the Project AoI have not been excluded.

Breeding bird surveys consisted of 1 hour or 5 km transects near select turbines each month in April, May and June. All seen and heard species were recorded with corresponding European Bird Atlas codes, along with counts for each month. All recorded species, including those observed but are not concluded as breeding, are presented in Table 12.15.

Note that while Egyptian Vulture breeding was not recorded in the scope of these surveys conducted near the footprint, the species is very likely breeding within the AoI.

Two Long-legged Buzzard (Buteo rufinus) nests were found, one at 38.842N and 37.098 E. 635 m SW of the Turbine 1, and the other was 38.908 N and 37.056 E, almost on the ETL line, between ETL VP1 and ETL VP2.

Additionally, though not globally threatened, two breeding species were identified which have potentially threatened national status. These are the Black-bellied Sandgrouse (*Pterocles orientalis*) (VU nationally) and the Greater Sand Plover (*Anarhynchus leschenaultii*) (EN nationally).

Table 12.15: Breeding bird species recorded during spring baseline studies.

Common Name	Scientific Name	IUCN	Breeding Code	April	May	June
Ruddy Shelduck	*Tadorna ferruginea*	LC	16	-	9	-
Common Quail	*Coturnix coturnix*	LC	1	-	2	-
Rock Dove	*Columba livia*	LC	-	-	21	-
Black-bellied Sandgrouse	*Pterocles orientalis*	LC	1	2	1	1
Common Crane	*Grus grus*	LC	-	-	3	-
Little Ringed Plover	*Charadrius dubius*	LC	-	-	1	-
Greater Sand Plover	*Anarhynchus leschenaultii*	LC	5	-	4	-
Wood Sandpiper	*Tringa glareola*	LC	-	-	1	-
Black Stork	*Ciconia nigra*	LC	-	-	1	-
Egyptian Vulture	*Neophron percnopterus*	EN	-	-	1	-
European Honey Buzzard	*Pernis apivorus*	LC	-	-	3	-
Booted Eagle	*Hieraaetus pennatus*	LC	-	-	-	-
Golden Eagle	*Aquila chrysaetos*	LC	1	3	-	1
Western Marsh Harrier	*Circus aeruginosus*	LC	-	-	1	-
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	1	-	-
Common Buzzard	*Buteo buteo*	LC	1	1	1	-
Long-legged Buzzard	*Buteo rufinus*	LC	11	1	6	-
Eurasian Eagle-Owl	*Bubo bubo*	LC	-	-	1	-
Eurasian Hoopoe	*Upupa epops*	LC	-	-	1	-
European Bee-eater	*Merops apiaster*	LC	-	-	15	-
Common Kestrel	*Falco tinnunculus*	LC	1	1	1	1
Red-footed Falcon	*Falco vespertinus*	LC	-	-	1	-
Red-backed Shrike	*Lanius collurio*	LC	-	1	-	-
Eurasian Magpie	*Pica pica*	LC	-	1	1	-
Red-billed Chough	*Pyrrhocorax pyrrhocorax*	LC	1	-	5	-
Eurasian Jackdaw	*Corvus monedula*	LC	-	-	5	2
Rook	*Corvus frugilegus*	LC	-	7	1	-
Hooded Crow	*Corvus cornix*	LC	-	-	2	-
Common Raven	*Corvus corax*	LC	-	-	2	-
Horned Lark	*Eremophila alpestris*	LC	12	-	11	2
Greater Short-toed Lark	*Calandrella brachydactyla*	LC	2	-	3	-
Calandra Lark	*Melanocorypha calandra*	LC	2	-	4	-
Eurasian Skylark	*Alauda arvensis*	LC	14	-	3	-
Crested Lark	*Galerida cristata*	LC	2	-	2	-
Sand Martin	*Riparia riparia*	LC	-	-	-	-
Barn Swallow	*Hirundo rustica*	LC	-	-	3	-
Common House Martin	*Delichon urbicum*	LC	-	-	-	-
Common Chiffchaff	*Phylloscopus collybita*	LC	-	-	-	-
Common Starling	*Sturnus vulgaris*	LC	-	-	-	-
Rufous-tailed Rock Thrush	*Monticola saxatilis*	LC	14	-	3	-
Northern Wheatear	*Oenanthe oenanthe*	LC	12	-	5	2
Finsch's Wheatear	*Oenanthe finschii*	LC	1	-	-	2

Common Name	Scientific Name	IUCN	Breeding Code	April	May	June
House Sparrow	*Passer domesticus*	LC	-	-	5	-
Rock Sparrow	*Petronia petronia*	LC	2	-	-	-
White-winged Snowfinch	*Montifringilla nivalis*	LC	12	-	4	-
Western Yellow Wagtail	*Motacilla flava*	LC	14	-	15	-
Tawny Pipit	*Anthus campestris*	LC	1	-	1	-
Common Linnet	*Linaria cannabina*	LC	-	-	5	-
Black-headed Bunting	*Emberiza melanocephala*	LC	2	-	1	-
Corn Bunting	*Emberiza calandra*	LC	2	-	4	-
Ortolan Bunting	*Emberiza hortulana*	LC	-	-	1	-

12.3.4 Bats

While the Project AoI may not be a suitable area due to low productivity limiting food source of bats, and low availability of overground roosting structures limiting woodland bats, the Project AoI might seasonally support bat populations mid-range and long-range migratory movements. Additionally, due to the rocky montane terrain character, the area supports many rocky structures, cliffs, caves, and canyon walls which can host colonies during hibernation. Presence of Red-billed chough (*Pyrrhocorax pyrrhocorax*) as demonstrated in supplementary baseline studies and in literature confirms this expectation since the species associates with cave and cavities as well.

Supplementary baseline studies were conducted in autumn 2023 and in 2024 (April-November) for the Project. A low number of recordings were obtained and low activity was observed overall. In April and May, however all the survey periods were during nightly temperatures below 10 degrees Celsius due to the Project area's climate, which is below the activation temperature of bat species. The surveys recorded a maximum of 223 bat passes in June and an overal total of 390 bat passes in 2024 which is very low. The most commonly recorded species across the survey period included *Hypsugo savii, Pipistrellus pipistrellus, Myotis* species, and *Pipistrellus kuhlii/nathusii*. The presence of diverse species indicates some level of habitat use, but the generally low activity levels suggest that the study area does not serve as a significant bat hotspot.

During the studies, only one individual of *Nyctalus lasiopterus* with IUCN red list category VU was recorded in the Project area. The species has been recently discovered to inhabit previously unknown habitats and ranges in Turkiye, unlike what the textbook preferences may suggest such as a strong preference for moist mature woodland and old tree hollows as roosting places. Recent unpublished data shows that the species can opportunistically utilize montane and steppe habitats. This could be due to this species' large size and ability to move long distances. In order to better understand the status of this species in the Project area, an acoustic study and roost study should be carried out in 2025 with a focus on *Nyctalus lasiopterus.* Tohma Valley is likely to be a hotspot for bat activity, including this species.

A list of species indicated in literature (L) and recorded during bat baseline studies[131] (O) are presented in Table 12.16.

Table 12.16. List of bat species and conservation status for the Project AoI.

Common Name	Scientific Name	IUCN Global	IUCN Eu	IUCN Med	Bern	Habitat Dir.	L/O
Serotine	*Eptesicus serotinus*	LC	-	-	II	IV	L
Savi's Pipistrelle	*Hypsugo savii*	LC	LC	LC	II	IV	O
Anatolian Serotine	*Miniopterus pallidus*	LC	LC	LC	II	IV	L

[131] Pelit WPP Bird and Bat Activity Surveys Baseline Study Report (2023)

Schreiber's Bent-winged Bat	*Miniopterus schreibersii*	VU	-	-	I, II	II, IV	L*
Steppe Whiskered Bat	*Myotis aurascens*	LC	LC	LC	I, II	IV	L*
Lesser Mouse-eared Myotis	*Myotis blythii*	LC	NT	NT	I, II	II, IV	L*
Greater Mouse-eared Bat	*Myotis myotis*	LC	LC	LC	II	II, IV	L*
Schaub's Myotis	*Myotis schaubi*	LC	-	-	II	IV	L*
Giant Noctule	*Nyctalus lasiopterus*	VU	DD	NT	III	IV	O*
Lesser Noctule	*Nyctalus leisleri*	LC	LC	LC	II	IV	O
Noctule	*Nyctalus noctula*	LC	LC	LC	II	IV	O
Kuhl's Pipistrelle	*Pipistrellus kuhlii*	LC	LC	LC	I, II	IV	O
Common Pipistrelle	*Pipistrellus pipistrellus*	LC	-	-	I, II	IV	O
Brown Long-eared Bat	*Plecotus auritus*	LC	-	-	I, II	IV	L*
Mountain Long-eared Bat	*Plecotus macrobullaris*	LC	NT	NT	II	IV	L*
Mediterranean Horseshoe Bat	*Rhinolophus euryale*	NT	VU	VU	II	II, IV	L
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	LC	NT	NT	II	II, IV	L
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	LC	NT	NT	II	II, IV	L
Mehely's Horseshoe Bat	*Rhinolophus mehelyi*	VU	VU	VU	II	II, IV	L
European Free-tailed Bat	*Tadarida teniotis*	LC	LC	LC	II	IV	O
Particoloured Bat	*Vespertilio murinus*	LC	LC	-	II	IV	L

IUCN: CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient. L: Literature, O: Observation. L*: As a result of the analysis, Myotis spec. and Plectosu spec. represent Myotis spec. and Plectosu spec. which could not be identified on a species basis and were identified on a group basis.

12.3.5 Terrestrial Fauna (Non-bat mammals, reptiles, amphibians)

The habitats of the Project AoI, montane steppes, agricultural fields and rock features provide habitat for terrestrial fauna. The terrestrial fauna baseline primarily relies on National EIA study, which was conducted during winter (ecologically not appropriate timing) and perusing other available literature. Baseline terrestrial fauna elements, especially White-banded Mountain Viper presence/absence at the Project AoI, should be clarified via field surveys prior to construction. Thus, additional fauna studies were conducted by fauna expert Mustafa Sözen on April 25-27 2024 and June 7-12 2024.

While the construction works had just started in turbine areas 1 and 2 during the first field studies, it was observed that the construction and access road works had reached to turbine area 12 during the studies carried out in June. Since the construction works in these areas have progressed and are ongoing, no work was carried out in these areas during the field studies in June 2024.

An Ecosystem Assessment Report was prepared for the Pelit WPP site in 2017 and a national EIA report was prepared in 2018. In addition, a new updated field study was carried out in 26 survey station areas determined by Mustafa Sözen and his team, representing different

ecosystem, habitat types of the region covering 14 turbine areas, switchyard and ETL areas throughout the Pelit WPP project area. In this study, in addition to the reports of previous studies, the results of the field surveys carried out in April and June 2024 in the Project area are evaluated together. Thus, the studies were carried out in the areas where the turbines were planned to be installed, in the switchyard, on the ETL route and in areas representing different habitat types in the project AoI. A total of 26 study points were visited in the form of transect walks and faunistic data were collected.

A list of terrestrial fauna is presented in Table 12.17.

Common Tortoise is categorised as globally Vulnerable. The species is common and widespread in Anatolia and populations are robust.

White-banded Mountain Viper is Endangered endemic reptile species. There are gaps in research regarding habitat and ecology of the species; however, the Project AoI is suitable habitat for the species and as such individuals of the species were observed during field studies. The species is under pressure due to habitat loss from land conversion (agriculture and animal grazing) and road construction.

Marbled Polecat has a habitat preference for grassland and rocky areas and feeds on steppe rodents. The species habitat preference overlaps with Project AoI.

Eurasian Lynx was indicated for the Project AoI in the National EIA studies. The most recent IUCN range map (2014) has the species range extend up to halfway point between Elbistan and Gurun. On the northern end, the species is extending from Divrigi down to Kangal. The indication here is that the species is associating with the wooded areas in the region primarily and the surrounding steppe habitats secondarily. Their home ranges are large; therefore, the species might be able utilize the habitats between the two disconnected ranges. Due to animal grazing, the grass length remains low, and hunting pressure is likely present for the species in the region for protection of grazing animals.

Table 12.17: List of terrestrial fauna species and conservation status for the Project AoI

Common Name	Scientific Name	IUCN Global	Bern	Habitat Dir.	L/O
Amphibians					
Green Toad	*Bufotes viridis*	LC	II	IV	O
Caucasian Frog	*Rana macrocnemis*	LC	II, III	-	O
Reptiles					
Common Tortoise	*Testudo graeca*	VU	I, II	II, IV	L
Starred Agama	Stellagama stellio Syn. Laudakia stellio	LC	II	-	L
Horny-scaled Agama	*Trapelus ruderatus*	LC	II	-	L
Chernov's Skink	*Ablepharus chernovi*	LC	III	-	L
Bridled Mabuya	*Heremites vittatus*	LC	III	-	O
Medium Lizard	*Lacerta media*	LC	II, III	-	L
Valentin's Lizard	*Darevskia valentini*	LC	III	-	O
Cappadocian Lizard	*Aphatya cappadocica*	LC	III	-	O
Snake-eyed Lizard	*Ophisops elegans*	LC	II	III, IV	L
Dwarf Lizard	*Parvilacerta parva*	LC	II	-	O
Red-Bellied Racer	*Dolichophis schmidti*	LC	III	-	L

Common Name	Scientific Name	IUCN Global	Bern	Habitat Dir.	L/O
Ring-Headed Dwarf Snake	*Eirenis modestus*	LC	III	-	L
Eastern Four-Lined Ratsnake	*Elaphe sauromates*	LC	III	-	L
Spotted Whip Snake	*Hemorrhois ravergieri*	LC	III	-	O
Grass Snake	*Natrix natrix*	LC	III	III	L
Dice Snake	*Natrix tessellata*	LC	II	IV	L
Eurasian Blind Snake	*Xerotyphlops vermicularis*	LC	III	-	L
White-banded Mountain Viper	*Montivipera albizona* **Endemic Species*	EN	I,II	-	O
Non-bat Mammals					
Southern White-breasted Hedgehog	*Erinaceus concolor*	LC	III	-	L
Transcaucasian Water Shrew	*Neomys teres*	LC	III	-	L
Gueldenstädt's Shrew	*Crocidura gueldenstaedti*	LC	III	-	O
European Hare	*Lepus europaeus*	LC	III	-	L
Anatolian Ground Squirrel	*Spermophilus xanthoprymnus*	NT	-	-	O
Williams's Jerboa	*Scarturus williamsi*	LC	-	-	O
Persian Vole	*Microtus irani*	VU	-	-	O
	Microtus rossiaemeridionalis	LC	-	-	O
European Snow Vole	*Chionomys syriacus*	LC	III	-	O
Grey dwarf hamster	*Cricetulus migratorius*	LC	-	-	O
Brandt's Hamster	*Mesocricetus brandti*	NT	-	-	L
Yellow-necked Mouse	*Apodemus flavicollis*	LC	-	-	O
Broad-toothed field mouse	*Apodemus mystacinus*	LC	-	-	O
Steppe field mouse	*Apodemus witherbyi*	LC	-	-	O
Macedonian mouse	*Mus macedonicus*	LC	-	-	L
Tristram's Jird	*Meriones tristrami*	LC	-	-	O
Nehring's Blind Mole Rat	*Nannospalax xanthodon*	LC	-	-	O
Forest Dormouse	*Dryomys nitedula*	LC	III	-	
Woolly Dormouse	*Dryomys laniger* **Endemic Species*	DD	II, III	-	O
Red fox	*Vulpes vulpes*	LC	III	-	L
Grey Wolf	*Canis lupus*	LC	II	II, IV, V	L
Brown Bear	*Ursus arctos*	LC	II	II,IV	L
Least weasel	*Mustela navilis*	LC	III	-	L
Marbled Polecat	*Vormela peregusna*	VU	I,II	II,IV	L
Beech marten	*Martes foina*	LC	III	-	L
Eurasian Badger	*Meles meles*	LC	III	-	L
Eurasian Lynx	*Lynx lynx*	VU	I,III	II,IV	L

Common Name	Scientific Name	IUCN Global	Bern	Habitat Dir.	L/O
Wild boar	*Sus scrofa*	LC	III	-	L
Wild Goat	*Capra aegagrus*	NT	II	II,IV	L

IUCN: CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern, DD: Data Deficient. L: Literature, O: Observation.

12.3.6 Ecosystem Services

PR6 acknowledges the significance of preserving the advantages that individuals and businesses obtain from ecosystems. Therefore, project development must be balanced, and the potential for utilizing the various economic, social, and cultural values of biodiversity and living natural resources should be evaluated in an optimized manner.

According to The Millennium Ecosystem Assessment (MA)[132], ecosystem services can be classified as follows.

- Provisioning services; are goods or products obtained from ecosystems, such as food, timber, fibre and freshwater,
- Supporting services; are the natural processes, such as nutrient cycling and primary production that maintain other services,
- Regulating services; are the contributions to human well-being arising from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards,
- Cultural services; are the non-material contribution of ecosystems to human well-being, such as recreation, spiritual values, and aesthetic enjoyment.

The service provided by the Project impact area that can be identified is agricultural activities (chickpea, barley, wheat and clover). The agricultural land can also serve as habitat for small mammals. Potential species are specified in Section 12.3.5. In addition, animal grazing (mainly sheep and to a lesser extent cattle) and beekeeping activities have been identified in the villages around the Project Area. In addition, during stakeholder interviews, it was understood that there are 200 registered beehives (13000 thousand bees). Also, there is mushroom collecting in the area, limited to 15 days in the summer months. The collected species are not traded, and it has been stated that they are collected only for domestic use. Also, plant species that can be collected in this context were also identified in the field survey.

12.3.7 Invasive Alien Species

Invasive alien species (IAS) are defined by the Convention on Biological Diversity (CBD) as species that threaten biological diversity by spreading outside their natural past or present distribution. IAS can occur in all taxonomic groups of organisms, including animals, plants, fungi, and microorganisms, and can affect all types of ecosystems. Invasion by alien species is reported to have caused significant degradation with negative impacts on biological diversity and people's livelihoods according to IUCN, which requires that all projects that may provide a key pathway for invasive species are screened for their potential to accidentally introduce invasive alien species. In line with provisions of PS6 and PR6, projects that potentially cause introduction of alien species are subject to a risk assessment. Once established, eradication of IAS requires more effort and resource allocation. Prevention is the first step in management.

While studies on terrestrial IAS in Türkiye have been rather limited, Türkiye has a wide marine IAS dataset. Studies that have already been conducted reveal that an estimated 1.5% of plant

[132] Milennium Ecosystems Assessment (MA). 2005. *Ecosystems and Human Well-being: Biodiversity Synthesis*. Washington, D.C.: World Resources Institute.

species in Türkiye are exotics. Additionally, the following species have been recorded in the EPPO list of invasive alien plants that are present in Türkiye: *Acroptilon repens, Ailanthus altissima, Ambrosia artemisiifolia (A. elatior), Carpobrotus edulis, Cortaderia selloana, Cyperus esculentus, Paspalum distichum (P. paspalodes), Oxalis pes-caprae and Sicyos angulatus.* Furthermore, *Azolla filiculoides* and *Rhododendron ponticum* are listed in the EPPO Observation List of Invasive alien plants and *Miscanthus sinensis*, listed in the EPPO Alert List, are also recorded in the Turkish flora[133].

The use of nitrogenous fertilizers in agricultural areas, destruction caused by plowing, manure of farm animals (feces), and transfer of seeds by vehicles can lead to an increase in the number of individuals of some species. These species are called “opportunists”. The plants that are common in agricultural areas, roadsides, and around agricultural structures are the species found in the natural flora of Türkiye. It is possible that *Centaurea solstitalis, Cirsium arvense* and *Rumex acetosella*, which are among the species defined as invasive in Türkiye according to the global invasive database[134], will increase their spread in region during construction activities. Although these four species are natural for Türkiye, they are opportunistic species. *Centaurea solstitalis* and *Rumex acetosella* were observed during baseline flora studies.

12.4 Assessment of Biodiversity Impacts

This section presents the identification and assessment of the likely beneficial and adverse biodiversity impacts of the Project during construction and operation. The Project’s impacts have been addressed separately for each activity (construction and operation) and for each key receptor.

Mitigation measures are presented after impact assessment in Section 12.6. A summary of the significant residual impacts remaining following implementation of mitigation and the compensation required are also presented in Table 12.20.

12.4.1 Biodiversity Receptors

Sensitive biodiversity receptors confirmed or likely to be present within the AoI of the Project are outlined in Table 12.18 and discussed in the sections below. Those species that are likely to be absent in the AoI (they could be present in the EAAA) have been scoped out from the impact assessment in this section and are not discussed further.

The sensitivity levels of each biodiversity receptor are determined following the assessment methodology outlined above. The features listed in Table 12.18 below are the focus of the impact assessment and mitigation measures.

Table 12.18: Summary of Main Biodiversity Receptors

Receptor	Sensitivity	Brief Description
Terrestrial Modified Habitats	Low	Agricultural crops Buildings and man-made structures
Terrestrial Natural Habitats	Medium	C2.3-Permanent non-tidal, smooth-flowing watercourses D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks E1.2-Perennial calcareous grassland and basic steppes H3.2- Basic and ultra basic cliff rock H3.5- Almost bare rock pavements, including limestone pavements

[133] Arslan, Z.F., Uludag, A., Uremis, I. 2015. *Status of invasive alien plants included in EPPO Lists in Turkey*. EPP/EPPO Bulletin. 45 (1). 66-72.

[134] Global Invasive Species Database. http://www.iucngisd.org/gisd/

Receptor	Sensitivity	Brief Description
Terrestrial flora	High	IUCN CR EN VU species Rare and threatened species within the AoI *Allium yamadagense* *Asyneuma davisianum* *Silene caryophylloides subsp. binbogaensis* *Astragalus stridii* *Campanula pinnatifida var. pinnatifida* *Minuartia dianthifolia subsp. cataonica* *Minuartia rimarum var. multiflora* *Astragalus dumanii* *Paronychia cataonica* *Thymus cappadocicu* *Thesium aureum* *Hyacinhella acutiloba*
Terrestrial flora	Medium	Widespread endemic species within the AoI *Aethionema caespitosum* *Aurinia rupestris subsp. cyclocarpa* *Minuartia corymbulosa var. corymbulosa* *Phryna ortegioides* *Astragalus haussknechtii* *Acantholimon kotschyi* *Galium cornigerum* *Prangos meliocarpoides var. meliocarpoides* *Nonea stenosolen* *Gypsophila laricina* *Centaurea drabifolia subsp. cappadocica* *Convolvulus assyricus* *Astragalus condensatus* *Peucadanum palimbioides* *Alyssum lepidotum* *Erysimum thyrsoideum* *Minuartia erythrosepala var. cappadocica* *Silene nuncupanda* *Achillea lycaonica* *Centaurea armena* *Centaurea mucronifera* *Centaurea laniger* *Helichrysum arenarium subsp. rubicundum* *Helichrysum chionophilum* *Cousinia eriocephala* *Scorzonera tomentosa* *Tanacetum cadmeum subsp. orientale* *Tanacetum argenteum subsp. argenteum* *Pterocephalus pinardii* *Astragalus hirsutus* *Astragalus lamarckii* *Ebenus laguroides* *Hedysarum erythroleuucum* *Marrubium globosum subsp. globosum* *Micromeria cremnophila subsp. anatolica* *Phlomis capitata* *Phlomis linearis* *Salvia caespitosa* *Linaria corifolia* *Alopecurus lanatus* *Elymus lazicus subsp. divaricatus* *Iris stenophylla subsp. tauri* *Iris schachtii* *Allium sivasicum*

Receptor	Sensitivity	Brief Description
		Bellevalis gracilis *Fritillaria aurea* *Muscari aucheri* *Muscari coeleste*
Terrestrial flora	Low	All wide-spread flora species within the AoI
Terrestrial fauna	High	IUCN EN CR species Endemic species *Montivipera albizona*
Terrestrial fauna	Medium	IUCN VU species *Microtus irani* *Dryomys laniger* *Testudo graeca* *Vormela peregusna* *Lynx lynx*
Terrestrial fauna	Low	All other terrestrial fauna species within the AoI
Bats	High	High collision risk and/or conservation concern and/or migratory species: CH and PBF species
Bats	Medium	All other bat species within the AoI
Birds	High	Medium and large bodied soaring species IUCN CR EN VU species CH and PBF species
Birds	Medium	All other large-bodied soaring species
Birds	Low	All other bird species within the AoI
Ecosystem services	Low	Agricultural activities Animal grazing Beekeeping Collecting species

12.4.2 Construction Impacts

12.4.2.1 Summary of Impacts during Construction

Construction impacts were assessed as they pertain to biodiversity and found to cause both temporary disturbance type impacts and permanent impacts that would last after construction activities are over. Some of the more significant impacts are, in summary;

- Loss and degradation of habitats which support several rare, threatened or endemic species
- Increased levels of noise, artificial light and vibration resulting from construction activities, vehicles and machinery, resulting in wildlife disturbance,
- Loss of ecosystem services,
- Movement of construction vehicles and heavy machinery, leading to injury or killing of wildlife,
- Dust and noise emissions from construction equipment, machinery and vehicle movement,
- Soil pollution from run-offs, accidental spills, wastewater, sewage and equipment cleaning, causing habitat degradation,
- Introduction of IAS impacting native biodiversity.

12.4.2.2 Assessment of Likely Construction Impacts

Habitats

The Asian part of Türkiye, i.e. Anatolia, is located at the intersection of the Caucasus, Irano-Anatolian, and Mediterranean basin, globally important biodiversity hotspots, indicating high level of biodiversity and high rate of endemism[135]. This situation has been associated with the one of the most distinctive biogeografical features called the Anatolian diagonal. The Anatolian diagonal runs from the northeast of Turkey (i.e. from the vicinity of Bayburt-Gümüşhane) to the southwest, where it splits into two branches toward the Mediterranean, one through the Amanos Mountains and the other through the Central Taurus Mountains. It divides inner Anatolia, covered by the western part of the Irano-Anatolian hotspot into two regions (i.e. central lowland Anatolia, mainly <1500 m, and eastern highland Anatolia, mainly >1500 m) with different faunistic or floristic communities[136]. It acts as a barrier to dispersal of flora and fauna populations, shaping current species composition distributed across Turkey and dividing species/lineage distribution into east and west by triggering key evaluatinary processes such as speciation and resulting in high biodiversity level together with the distinguised ecological and climatic factors. The region is distinguished by a mountainous topography interspersed with elevated plateaus. The winter season is marked by severe conditions, with substantial snowfall that persists for extended periods. Following the snowmelt in the spring months of April and May, the ecological productivity is notably elevated. However, during the summer months, agricultural grazing practices and the dry season conditions result in a significant reduction in vegetation, leading to a substantial removal of biomass by the autumn. This fluctuations also affects the faunistic and floristic communities. The extent of the Anatolian diagonal varies regionally and there are no studies on a general estimate. According to Seyitoglu et al., 2021, The Amanos Mountains line is given as 170 km in width[137], the Project area is parallel to the Central Anatolian part and remains approximately 150 km west of it. This might explain the presence of the high flora and fauna endemism in the Project area.

The Project AoI mostly comprises steppe and rocky habitats with low level of anthropogenic influence, in addition to rich bottom meadows at parts. Some modified habitats are present as well such as agricultural fields, residential areas, modified streams and a water reservoir. The Project AoI supports several types of natural habitats of carrying significance for flora and fauna of conservation importance. The direct footprint and consequentially the Project AoI are quite small, however since several high sensitivity receptors are identified which rely on these habitats, construction activities are expected to impose negative effects on these biodiversity features. Construction activities will impact the natural and modified habitats in the forms of habitat loss and degradation (as a result of vegetation clearing and rock blasting for installation of the Project components such as roads, turbine pads, ETL route) including fragmentation and edge effects and are limited to the footprint. These effects are certain to occur within the AoI due to construction activities and are irreversible. The Project impacts on all these habitats affected directly are likely to be minor during construction while for those identified as critical habitats impacts are likely to be moderate.

[135] Hakan Gür (2016) The Anatolian diagonal revisited: Testing the ecological basis of a biogeographic boundary, Zoology in the Middle East, 62:3, 189-199, DOI:10.1080/09397140.2016.1226544

[136] Welch, H., & Kirwan, G. M. (2008): Turkey's ecoregions: their biodiversity and conservation. Pp. 31–41. In: Kirwan, G., Demirci, B., Welch, H., Boyla, K., Özen, M., Castell, P., & Marlow, T. (Eds.), The Birds of Turkey. London: Helm.

[137] Seyitoğlu, G., Tunçel, E., Kaypak, B., Esat, K., et al. (2022). The Anatolian Diagonal: A Broad Left-Lateral Shear Zone Between the North Anatolian Fault Zone and the Aegean / Cyprus Arcs. Türkiye Jeoloji Bülteni, 65(2), 93-116. https://doi.org/10.25288/tjb.1015537

Flora

Due to the unique geographical configurations of the region, the Project's baseline flora surveys revealed a large number endemic species, and a high overall percentage of endemism, including range restricted species. Additionally, several of the flora species identified at the Project AoI are of conservation concern, including National Red List CR, EN and VU species, and have been identified as high sensitivity receptors.

Construction activities will impact the flora species in the forms of habitat loss and degradation (as a result of topsoil stripping, vegetation clearing and rock blasting for installation of the Project components such as roads, turbine pads, ETL route) including fragmentation and edge effects and are limited to the footprint. These effects are certain to occur within the AoI due to construction activities and are irreversible. Dust and pollution impacts are also pertinent during construction.

The Project impacts on flora species of high sensitivity are likely to be of moderate magnitude during construction, while for widespread endemics identified as having medium sensitivity the impact is likely to be minor.

Terrestrial Fauna

Threatened and endemic terrestrial fauna species were identified as either present or likely present within the 5 km AoI. Construction activities will impact the terrestrial fauna the forms of habitat loss and degradation (as a result of vegetation clearing and rock blasting for installation of the Project components such as roads, turbine pads, ETL route). Direct loss of nests and shelter structures of these species will be limited to the footprint especially pertinent for topsoil stripping activities, while fragmentation and edge effects can be considered as impacting the AoI. Temporary disturbance during construction activities, pollution, light and noise disturbance, and accidental injury or death are possible. Construction impact on these species will be reversible for the most part. *Montivipera albizona* is an endemic reptile species which is Endangered (EN) and is identified as a high sensitivity receptor. Construction impact on species with high sensitivity is considered moderate, while for those species as having medium sensitivity are expected to be minor.

Bats

Globally vulnerable bat species were indicated for the site in the literature and observed in the ongoing baseline studies, along with other regionally threatened and near threatened species. *Nyctalus lasiopterus* (VU) was identified through field studies. Construction activities will impact bats in terms habitat loss and degradation (as a result of vegetation clearing and rock blasting for installation of the Project components such as roads, turbine pads, ETL route). Direct loss of nests and shelter structures of these species will be limited to the footprint. Extensive loss of roosting structures is not expected except at the turbine placements where rock will be cleared for construction which can result in loss of cavities, if any. Temporary disturbance during construction activities, pollution, light and noise disturbance, and accidental injury or death are possible. Construction impact on these species will be reversible for the most part. Construction impacts of the Project are limited and minor for the described impact types.

Birds

Construction activities will impact bird species in terms habitat loss and degradation (as a result of vegetation clearing and rock blasting for Project components such as roads, turbine pads, ETL route). The Project AoI generally does not provide good opportunities for nesting and natural perching structures, however suitable habitat for ground nesting and cliff nesting raptors are present. Extensive habitat loss and degradation is not expected, and neither are fragmentation and edge effects. Temporary disturbance during construction activities, pollution,

light and noise disturbance, and accidental injury or death are possible. Construction impact on these species will be reversible for the most part. Construction impacts of the Project are limited and minor for the described impact types.

Impact on the high sensitivity bird species is considered medium. *Neophron percnopterus*, if actively nesting at the Project AoI at the time of construction, might be impacted due to construction disturbance during its breeding activities. Potential nest sites around the alternative ETL route were identified. Depending on the level of environmental disturbance and proximity of the construction activities to any active nest sites, breeding activity of pair might be impacted within the AoI. While the impact on breeding activity will not be permanent and will cease after construction, partial or full loss of clutch for the year would still be considered significant.

Ecosystem Services

The primary ecosystem services defined for the Project are agricultural activities, sheep and cattle farming, and beekeeping. Collecting medicinal and aromatic plants or mushrooms is not done for commercial purposes. The project impact on this collection, which is carried out for domestic use by a few households, is low. The impact of the project's footprint on ecosystem services is considered negligible.

12.4.3 Operational Impacts

12.4.3.1 Summary of Impacts during Operation

Operational phase impacts were assessed as they pertain to biodiversity and found to cause mainly permanent impacts that would last for the lifetime of the Project without proper management. Some of the more significant impacts are, in summary;

- Permanent habitat loss and degradation due to Project footprint, and potential footprint creep
- Loss of ecosystem services,
- Introduction of invasive alien species impacting native biodiversity,
- Wildlife disturbance due to an eventual increase in noise levels, artificial light as a result of presence of turbines,
- Collision, electrocution and barotrauma injury and mortality risks of bird and bat species

12.4.3.2 Assessment of Likely Operation Impacts

As menitoned in the contruction impact sections, the location of the Project area close to the Anatolian Diagonal is indicating high biodiversity and endemism level in the Project area.

Habitats

As menitoned in the contruction impact sections, the location of the Project area close to the Anatolian Diagonal is indicating high biodiversity and endemism level in the Project area.The Project AoI mostly comprises steppe and rocky habitats with low level of anthropogenic influence, in addition to rich bottom meadows at parts. Some modified habitats are present as well such as agricultural fields, residential areas, modified streams and a water reservoir. The Project AoI supports several types of natural habitats of carrying significance for flora and fauna of conservation importance. The direct footprint and consequentially the Project AoI are quite small, however since several high sensitivity receptors are identified which rely on these habitats, operation activities are expected to impose negative effects on these biodiversity features. Operation activities will impact the natural and modified habitats in the forms of sustained habitat loss and degradation including fragmentation and edge effects. Other impact types include dust, noise and light emissions from operational activities and improper waste management. Footprint creep due to factors such as creation of operation staff parking,

temporary or permanent supply or equipment storage and other purposes will remain a concern during operation phase. The Project impacts on all these habitats affected directly are likely to be minor during operation while for those identified as critical habitats impacts are likely to be moderate.

Flora

Some of the construction phase impact sources such as habitat loss and degradation, fragmentation and edge effects are permanent impact types for flora species and these impact types will persist during the operation phase. Other impact sources during operation phase are introduction of invasive species with vehicles and equipment which can compete with native flora, dust and pollutant impact (mainly from vehicles utilizing the site roads) and footprint creep (widening of roads, utilization of areas outside of Project footprint for parking, storage, temporary facilities etc). Impact on high sensitivity species is expected to be moderate while for the rest of the flora species identified, expected impact is minor to negligible.

Terrestrial Fauna

Threatened and endemic terrestrial fauna species were identified as present or likely to be present within the 5 km AoI. Persisting effects from construction will impact the terrestrial fauna the forms of habitat loss and degradation, fragmentation, and edge effects. Disturbance during operation due vehicular traffic, artificial light and noise, air pollution, and accidental injury or death are possible, in addition to deliberate killing by operation staff in case of fauna posing health hazards such as *Montivipera albizona* and other vipers. The magnitude of the impact on the species is ranging from moderate to negligible.

Bats

In 2025 (spring and fall), acoustic studies revealed that the project area is low in terms of bat activity. Considering the high risk of collision / barotrauma mortality and migration processes, bat species with high sensitivity were identified.At the operational phase, bat species including those that have high conservation value and those that belong to mid to long distance migratory populations will experience injury and mortality effects due to interaction with fast moving components i.e. the turbine blades. This can occur either due to direct collision with the blades or due to getting in the vicinity of the moving blades and experiencing barotrauma (internal injury) due to sudden and large changes in surrounding air pressure. Collision effect can be compounded by presence of artificial lights due to attraction of the prey species to light sources which in turn may attract population of bats to forage at the Project area. ETL is generally viewed as a negligible factor during operation, since bat species in Türkiye are not large enough to trigger electrocution. It has been evaluated that operational impacts may have a major impact on these species. Other impact types during operational phase are displacement and avoidance and barrier effects (for migrants) which are less pronounced.

Only one individual of *Nyctalus lasiopterus* with IUCN red list category VU was recorded in the project area. When the distribution map of this species is examined, it is not found in the project area and its vicinity and this species prefers old tree hollows as roosting places. The project area is not suitable for this species both in terms of region and habitat. However, this species can move long distances and fly high and it may have been recorded while passing through the project area. In order to better understand the status of this species in the project area, an acoustic study and roost study should be carried out in 2025 with a focus on *Nyctalus lasiopterus.*

Birds

Collision and electrocution injury and mortality of large soaring species, and other species of conservation importance are a major impact source during operation. In general, resident and

migratory large soaring species are the most affected due to a combination of their behavioural traits, morphology, and life cycle characteristics.

The Project is not located on general major and minor migratory routes. In general, significant levels of migratory activity is not expected due to both the Project's location in reference to known routes, and due to the immediate topography of the Project on a high mountain ridge. Facultative migration of *Otis tarda* might be a concern as eBird records show the species utilizing the region in winter. There are large data gaps regarding the extent of breeding and non-breeding ranges, along with migratory paths, of this species in Anatolia. The species is continually being identified in previously unrecorded regions and new migratory activity is being described. The species is well documented to be collision prone especially at overhead ETLs due to its wing load and low manoeuvrability. This effect is likely to be compounded in winter due to the birds needing to conserve energy and presence of high winds.

Supplementary baseline study indicated breeding activity of sensitive large bodied species, *Neophron percnopterus*. The Project AoI is described in the breeding atlas square in the EBBA, eBird records and satellite tracking records show activity of the species, and habitat is suitable. These species have slow reproductive cycles, and propensity for *attraction* and *habituation* to WPPs during operation which can increase mortality risks. WPP structures such as pylons and turbine towers are likely to attract the species. Furthermore, if fauna mortality (either terrestrial fauna due to vehicle collisions, or bird mortality due to blade collision) occurs in the WPP, the species is likely to be attracted to the carcasses. The species is also likely to be attracted to dead domestic animal carcasses, such as sheep as sheep are kept in the area, or of other animal remains such as placenta of domestic animals after birth. The terrain also adds to the risks as these species are shown to exhibit lower flights on high slopes. The species is well documented to be one of the most impacted species due to operation phase WPPs and ETLs.

The results of the Collision Risk Model did not predict increased collision risk during the migratory periods for these species. However, VP, breeding bird and CRM methodology is not considered comprehensive enough to eliminate potential of major risk for high sensitivity species due to several limitations described in the baseline sections of this report. A precautionary approach will be adopted until further clarifications are at hand.

Other impact types during operational phase are displacement and avoidance and barrier effects which are less pronounced, along with more minor influences like increased levels of disturbance and pollution, as well as the increased collision risk could impact bird species within the AoI. Collision effect can be compounded by artificial lights which can attract songbird species during migration.

Although barrier effect to migrants is considered to be less of a concern than the more immediate danger of collision and electrocution, it should be noted that migration is a very energy demanding process and having to avoid structures along the migratory route (that is, if they are able to avoid, as often they are not) comes at a high energetic cost.

Ecosystem Services

The primary ecosystem services defined for the Project are agricultural activities, sheep and cattle farming, and beekeeping. Collecting medicinal and aromatic plants or mushrooms is not done for commercial purposes. The project impact on this collection, which is carried out for domestic use by a few households, is low. The impact of the project operation on ecosystem services is considered negligible.

12.4.4 Summary

The impact assessment summary for construction and operation phases of the Project is given in **Table 12.19**.

Table 12.19: Summary of Construction and Operation Impacts, Pre-Mitigation

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Habitat loss and degradation	Natural Habitats	Low	Construction Operation	AoI	Irreversible	Certain	Minor	Medium	Minor
	Modified Habitats							Low	Negligible
Habitat loss and degradation Air, soil and water pollution Dust emissions IAS competition	IUCN CR EN VU species Rare and threatened species	Low	Construction Operation	Project footprint	Reversible	Possible	Minor	High	Moderate
	Widespread endemic species							Medium	Minor
	All other flora species							Low	Negligible
Habitat loss and degradation Air, soil and water pollution Artificial light Dust emissions Disturbance Accidental injury or death	*Montivipera albizona*	Low	Construction	AoI	Reversible	Possible	Minor	High	Moderate
	Microtus irani *Dryomys laniger* *Testudo graeca* *Vormela peregusna* *Lynx lynx*							Medium	Minor
	Other terrestrial fauna species							Low	Negligible
Habitat loss and degradation Air, soil and water pollution Dust emissions Disturbance	High conservation concern and/or migratory species bats	Low	Construction Operation	AoI	Reversible	Possible	Negligible	High	Negligible
	All other bat species within the AoI							Medium	Negligible
Collision / barotrauma mortality of bats	Bat species of conservation concern, high collision vulnerability, migrant species CH and PBF species	High	Operation	AoI	Irreversible	Possible	Major	High	Major
	Other bat species							Medium	Major
Habitat loss and degradation Air, soil and water pollution Dust emissions Disturbance	IUCN CR EN VU species CH and PBF species	Low	Construction Operation	AoI	Reversible	Possible	Minor	High	Moderate
	All other large-bodied soaring species							Medium	Minor
	All other bird species within the AoI						Minor	Low	Negligible
Collision / electrocution mortality of birds	IUCN CR EN VU species CH and PBF species	High	Operation	AoI	Irreversible	Possible	Major	High	Major
	All other large-bodied soaring species							Medium	Major
	All other bird species within the AoI							Low	Moderate
Artificial light	High Sentivity Fauna	Medium	Operation	Project footprint	Irreversible	Possible	Major	High	Major
	Medium Sensitivity Fauna						Moderate	Medium	Moderate
	Low Sensitivity Fauna						Minor	Low	Negligible

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Habitat loss and degradation Air, soil and water pollution Dust emissions Disturbance Accidental injury or death	*Montivipera albizona*	Low	Operation	AoI	Reversible	Possible	Minor	High	Moderate
	Microtus irani *Dryomys laniger* *Testudo graeca* *Vormela peregusna* *Lynx lynx*							Medium	Minor
	Other terrestrial fauna species							Low	Negligible

12.5 Impact Mitigation & Residual Impact

12.5.1 Habitat and Flora Loss and Degradation

The most significant impact of the land preparation and construction phase of the Project would be habitat loss or degradation for terrestrial flora and fauna species. The impact would be limited to the area where the roads and turbines would be constructed. The Project footprint is small. However habitats and flora of conservation concern were identified, some of which have elevated conservation concern and are endemics of very limited ranges.

The following mitigation measures will be applied throughout the Project:

- All construction and operational working areas will be kept to a minimum to reduce habitat loss,
- All type of impact on natural habitats outside the Project footprint will be avoided during land clearance and topsoil removal,
- Where ground preparation works are conductd, topsoil will be stripped and stored under appropriate conditions for later use in restoration activities,
- Boundaries of the construction areas, including traffic routes, will be limited only to designated sites,
- Established footprint of the Project will stay consistent throughout the operation phase and will not be expanded to prevent footprint creep impacts on habitats and associated high sensitivity flora and fauna,
- Seeds of threatened and priority biodiversity featuresflora will be collected to transfer to the Seed Bank and individuals will be also used for restoration/ no net loss-net gain targets. A restoration plan will be developed for the threatened flora. To establish new populations outside of the Project Area, 1) areas that are suitable for the growth of the species and where the population is weak, 2) areas where the population of the species is not present but are suitable as its habitat will be evaluated.
  - *Asyneuma davisianum*
  - *Campanula pinnatifida var. pinnatifida*
  - *Minuartia dianthifolia subsp. cataonica*
  - *Allium yamadagense*
  - *Silene caryophylloides subsp. binbogaensis*
  - *Astragalus stridii*
  - *Astragalus dumanii*
  - *Minuartia rimarum var. multiflora*
  - *Paronychia cataonica*
  - *Thymus cappadocicus*
  - *Thesium aureum*
  - *Hyacinhella acutiloba*
- Seed collection of wildflower species might be conducted, and the seeds may be used during the restoration process.

A “Restoration Plan” will be developed to restore the vegetation of the area including landscape analyses, methodology to be applied for repairing, assessment and determination of landscape characteristics and management. Please refer to Sections 6.5.1 and 6.5.2 for more information related to this section.

12.5.2 Disturbance to Animal Species, Injury/Mortality

Amphibians, reptiles and non-bat mammals in the Project AoI are likely to be affected by construction through habitat loss/degradation, disturbance (presence of people, artificial lighting, dust and noise), injury or mortality due to construction works and increased traffic, and temporary habitat fragmentation.

Terrestrial fauna species are likely to be affected by construction through habitat loss/degradation, disturbance (presence of people, artificial lighting, dust and noise), injury or mortality due to construction work, increased traffic and temporary habitat fragmentation. Construction activities will be limited to the Project area and the AoI; therefore, associated impacts will be confined to the AoI.

Loss of breeding sites and nests is another significant impact related to habitat loss, especially for those that are ground-nesting or utilizing rocky areas.

The increase in human activity in the Project area, the use of machinery and equipment, and the increase in activity on the transportation roads may cause disturbance in natural areas. This effect would be more pronounced during the construction phase. it is expected to decrease during operation phase.

The following mitigation measures will be applied:

- On-site vehicle speed limits, 30 km/h, wil be implemented to avoid potential road-kills,
- Dust suppression measures, such as water sprays, will be implemented for reduction of dust during the working period,
- Rock blasting will be avoided unless demonstrably necessary, and will be accompanied by an expert ecologist to safeguard sensitive species if unavoidable,
- During construction, fauna species observed in the Project AoI will be translocated to suitable habitat outside the AoI by experts. In particular, attention will be paid to *Testudo graeca*, *Montivipera albizona, Dryomys laniger, Vormela peregusna and Microtus irani* species.
- In order not to interfere with the needs of the species, aquatic habitats will not be contaminated.
- Installing artificial structures within the AoI for nesting, roosting or hibernating fauna, such as bird nesting boxes, bat roost boxes, shelter for terrestrial fauna will be considered. Siting decisions will be made to minimize the injury and mortality risks (consider proximity to roads, ETL and turbines).
- Site employees will be trained to be aware of significance of habitats and species, nests of fauna species, to avoid any destruction or displacement without an expert opinion on the status of the nests.

12.5.3 Accidental Introduction and Dispersal of Invasive Species

Introduction or spread of non-native invasive species accidentally is also a risk that can occur during construction activities which may cause impact with minor significance. The following generic mitigation measures will be applied throughout the Project:

- Minimise traffic and the distance it has travelled,
- Source goods/materials locally where possible,
- Contain any IAS and report their presence,
- Where IAS have been confirmed, ‘as-new’ wash-down is essential before entering non-infested areas of the site and after working in infested areas,
- IAS Management Plan will be developed to minimize construction and operation impacts

- Train and raise awareness of all site personnel regarding IAS species.

12.5.4 Collision, electrocution, and barotrauma injury and mortality

One of the major sources of impact on biodiversity during operational phase can be attributed to collision, electrocution, and barotrauma injury and/or mortality risks of bird and bat species.

While collision with the moving turbine blades is the main source of collision mortality, collision with other present structures such as turbine towers, pylons, fences, structures associated with the switchyard etc. can also cause injury and/or mortality. Collision risks affect both bird and bat species and the effect are sustained throughout the WPP's lifetime.

Electrocution effects are more pertinent to bird species. Triggering electrocution often requires interacting with multiple different electrified components, hence a certain body size is needed for electrocution although some bat species might also be large enough for electrocution.

Barotrauma injury and mortality is an impact type that is more pertinent for bat species. It requires no physical interaction with the turbines, it is sufficient that the bats are near turbines. As the turbines spin they cause sudden and relatively large changes in surrounding air pressure, which the small bodies of bats cannot tolerate. The result is internal damage to the organs due to pressure change which often causes the individual to suffer a slow death.

A robust, well designed, and comprehensive operational phase bird and bat monitoring programme is needed in order to assess the full scope of risks and manage them for this type of impact. These are detailed in Table 12.20.

The following mitigation measures will be applied throughout the Project:

- Artificial lighting will be managed carefully to avoid attracting and dazing birds and bats (also applies to attraction of other fauna),
- The ETL will be marked throughout to increase visibility for sensitive bird species,
- Turbines will be prevented from "freewheeling" (turbines will not be allowed to spin free during low wind and no energy generation conditions)
  - Adjustment of the blade angle ("feathering") prevents freewheeling.
- Bat deterrents are not considered at this stage since they are variable in efficacy.
- The Project components will be managed to not offer perching and nesting opportunities for birds,
  - The turbine towers and ETL pylons will be selected for eco-friendly designs, especially to deter large raptors such as Egyptian Vulture
- Safe perching, roosting and nesting opportunities will be provided for birds and bats,
- Trainings will be provided to raise awareness of all site personnel.

Table 12.20: Summary of Residual Effects, After the Application of Mitigation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Habitat loss and degradation	Natural Habitats	Minor	Negligible
Habitat loss and degradation Disturbance Air pollution IAS competition	Flora	Moderate	Minor
Collision / barotrauma mortality	Bats	Major	Moderate

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Habitat loss and degradation Air, soil and water pollution Dust emissions Disturbance	Birds (high sensitivity species)	Major	Minor
Collision mortality	Birds	Major	Moderate
		Moderate	Minor
Habitat loss and degradation Air, soil and water pollution Dust emissions Disturbance Accidental injury or death	Fauna (high sensitivity species)	Moderate	Minor

12.6 Biodiversity Monitoring and Adaptive Management

Table **12.21** summarises the biodiversity monitoring to be implemented during the construction and operation of the Project. See the most recent version of the stand-alone CHA document for further information regarding the biodiversity values of the Project.

An operational biodiversity monitoring programme will be scheduled in order to demonstrate the real impact on biodiversity, to further inform mitigation measures and objectives, and track performance with regards to mitigation. A significant component of the operation phase monitoring is development and implementation of Post-Construction Fatality Monitoring which is a multi-year, multi-step monitoring approach that informs mitigation decisions for bird and bat species.

An adaptive management programme will be developed for the Project if supplementary baseline and revised CHA shows necessary for high sensitivity bird species. This will be put in place to ensure that if significant impacts are detected during construction and operation stages these will be addressed. Data will need to be analysed and if significant changes in the ecological receptors are reported, further mitigation measures will be put in place.

Main impact to biodiversity values during operation is expected to be collision and barotrauma injury/mortality of bird and species. Since this impact source is tied directly to presence and operation of moving components (blade-wildlife conflict), adaptive management strategies are needed during operation lifetime. These will include:

- Based on ongoing baseline and operation monitoring, a Shut-down on demand (SDoD) or equivalent turbine management protocol will be developed by the Project company to safeguard large soaring bird species, if necessary. since the Project is has known threatened raptors breeding nearby, it will be important to safeguard these species from blade conflict.
- Based on the results of baseline and first year operation results of bat activity monitoring and bat mortality monitoring, a turbine curtailment approach regarding bat mortality mitigation will be developed if necessary, changes to cut-in speed of turbines (either blunt or smart curtailment), installation of Nacelle height bat detectors will be considered.

Table 12.21: Biodiversity monitoring to be implemented by the Project.

Receptor / Monitoring Topic	Responsibility	Monitoring parameters	Monitoring locations	Monitoring frequency	Project Phase	Adaptive Management / Mitigation
Natural Habitats and Flora	Project Company	● Habitat area/cover/ condition and land use change ● Target flora species, if any determined during supplementary baseline (population status) – *Allium yamadagense (CR),* – *Silene caryophylloides subsp. binbogaensis (EN),* – *Asyneuma davisianum (EN),* – *Astragalus stridii (EN),* – Other endemic and VU status flora species specified in the baseline ● Quality of landscaping at restored sites, if any (planted species)	All natural habitats, turbine locations and roads	Once annually in years 1 to 5 and 10	Construction Operation	Revise Biodiversity Management Plan and Revise Critical Habitat Assessment regarding results of Monitoring (if necessary) Develop Net Gain/No Net Loss Requirements (if necessary) Prepare Biodiversity Action Plan (if necessary)
Invasive alien species	Project Company	Identification of invasive alien species	Working areas of Project and adjacent habitats (including access roads)	Monthly during construction Annually during operation	Construction Operation	Revise Invasive Alien Species Management Plan (if necessary)
Wildlife Mortality (roads)	Project Company Ecologist	Identification of species of conservation importance that have been killed by vehicles and equipment	All roads on Project area	Ongoing during operation	Construction Operation	Revise Biodiversity Management Plan and Revise Critical Habitat Assessment regarding results of Monitoring (if necessary)
Birds	Project Company Bird Expert	Post construction VP bird monitoring (NatureScot) to establish: ● Operation phase bird activity and Collision Risk ● Confirm expectations regarding impact levels ● Identify deviation from predicted impact ● Inform further mitigation and management ● Provide a rough approximation of species not captured in post-construction VP studies and collision risk modelling using year-on-year dataset. This should be accomplished through matching the relative abundance and collision risk estimations of those species captured in the VP surveys, with the relative abundance of those not observed to approximate the collision risk for all species on the target checklist.	All turbine-swept areas and ETL ● >70% visual coverage of the 2 km buffer around the turbines and ETL ● 100% visual coverage of 5 km buffer around the turbines and ETL	Autumn 2023, spring and autumn 2024 and 2025, to cease if risk determined negligible. If non-negligible risk identified, monitoring to continue for 2 years of operation, to be reviewed after. Migration, breeding and wintering periods At least 36 hr/VP during spring, summer, autumn and winter each Winter studies to focus on *Otis tarda* possibility	Operation	Revise Biodiversity Management Plan and Revise Critical Habitat Assessment regarding results of Monitoring (if necessary) Develop Shut-down on demand protocol (if necessary) Develop Net Gain Requirements (if necessary) Prepare Biodiversity Action Plan (if necessary)
Birds	Project Company Bird Expert	Post construction annual breeding raptor monitoring: ● Confirm presence/absence of breeding Egyptian Vulture within the Project AoI ● Confirm breeding success of active nests ● Confirm re-activation of dormant nests ● Identify deviation from predicted impact ● Inform further mitigation and management	Project AoI (15 km) All suitable habitat	Autumn 2023, spring and autumn 2024 and 2025, to cease if risk determined negligible. If non-negligible risk identified, monitoring to continue once annually in years 1-5 and refresh at year 10, 20 and 30. ● Locate nests ● Check nest occupancy ● Check utilization of pylons and turbine towers	Operation	Revise Biodiversity Management Plan and Revise Critical Habitat Assessment regarding results of Monitoring (if necessary) Develop Shut-down on demand protocol (if necessary) Develop Net Gain Requirements (if necessary) Prepare Biodiversity Action Plan (if necessary)
Bats	Project Company Bat Expert	Post construction acoustic bat monitoring (NatureScot) to establish: ● Operation bat activity and species composition ● Confirm expectations regarding impact levels ● Identify deviation from predicted impact	All turbine swept areas Sampling stations as described in NatureScot	Autumn 2023, spring and autumn 2024 and 2025, to cease if risk determined negligible.	Operation	Revise Biodiversity Management Plan and Revise Critical Habitat Assessment regarding results of Monitoring(if necessary) Develop turbine curtailment approach (if necessary) Develop Net Gain Requirements (if necessary)

Receptor / Monitoring Topic	Responsibility	Monitoring parameters	Monitoring locations	Monitoring frequency	Project Phase	Adaptive Management / Mitigation
		● Inform further mitigation and management		If non-negligible risk identified, monitoring to continue first 2 years of operation and to be reviewed after. 3 seasons (during active periods for bats) 10 consecutive nights/season		Prepare Biodiversity Action Plan (if necessary)
Bats Birds	Project Company Expert with fatality monitoring and statistical estimation experience	Post construction bird and bat fatality monitoring (PCFM) (2023). The operational phase surveys will be designed according to principles outlined in the Post Construction Fatality Monitoring guidance. Survey design will include appropriate carcass search methodology, bias correction, experimental and control techniques. Statistical mortality estimations will be produced.	To be designed according to Good Practice Handbook on Post-construction Bird and Bat Fatality Monitoring (PCFM) for Onshore Wind Energy Facilities (WEFs) in Emerging Market Countries (2023) guidelines. All turbines and the ETL will be included in monitoring design.	Autumn 2023, spring and autumn 2024 and 2025, to not begin in operation if risk determined negligible. If non-negligible risk identified, monitoring to continue at least 3 years and will be further extended according to PCFM guidelines. Refresh study will be prescribed based on further monitoring. Monitoring will continue March-November until mitigation success is achieved, and bird/bat fatality are consistently below defined thresholds. At least 4 experimental studies each year of monitoring.	Operation	Revise Biodiversity Management Plan (if necessary) Develop Shut-down on demand protocol (if necessary) Develop and revise turbine curtailment approach (if necessary) Develop Net Gain Requirements (if necessary) Prepare Biodiversity Action Plan (if necessary) Develop turbine curtailment approach (if necessary)
Terrestrial fauna	Project Company Fauna Expert	Fauna surveys to monitor populations, mortality and breeding activity of *Testudo graeca, Montivipera albizona, Dryomys laniger, Vormela peregusna and Microtus irani.*	Project AoI	Weekly during construction Checks immediately prior to construction activities (ground preparation) Once during ecologically appropriate season in operation	Construction Operation	Revise Biodiversity Management Plan (if necessary) Develop Net Gain Requirements (if necessary) Prepare Biodiversity Action Plan (if necessary)

13 Social Environment

13.1 Introduction

This Chapter provides the details of the social baseline conditions of the Project-affected villages on the basis of district and village levels. The methodology of the information collection process, the Project impacts on the communities and other social receptors, the assessment process carried out during the ESIA study, and mitigation measures defined for the Project impacts are provided in line with the findings of the social studies conducted during the ESIA process of the Project.

13.2 Methodology

The following methods were utilized to understand the social impacts of the Project in the affected villages and to identify the extent of potential impacts of the Project on the local community members, households, vulnerable groups, and other social receptors:

- Desktop study,
- Site visit to the Project area,
- In-depth interviews and surveys with the local community members, mukhtars and key stakeholders.

13.2.1 Desktop Study

Secondary official data and documents about socio-economic conditions of Gürün district published by governmental authorities are assessed during the desktop study. Documents provided by the Project Company and official documents obtained from the public institutions during the site visit as well as information gathered through web research were utilized to describe demographic profile of the Project affected villages and Project's social AoI, including but not limited to the population data, main livelihood activities, land use practices, infrastructural conditions and access to certain services (i.e., education, transport, water and health services).

13.2.2 Site Visit to the Project Area

Through the support of the Project Company representatives, the Project area, residential areas, and Project affected villages were visited as part of the ESIA studies. The villages located in the immediate vicinity of the Project area were visited, local residents in these villages and key stakeholders (i.e., representatives of official institutions and the mukhtars) were consulted, which are listed below:

- Gürün District Directorate of Agriculture and Forestry
- Mukhtar and residents of Çiçekyurt village
- Mukhtar and residents of Koyunlu village
- Mukhtar and residents of Davulhüyük village
- Mukhtar of Kürkçü village
- Mukhtar of Reşadiye village
- Mukhtar of Yılanhüyük village

13.2.3 Limitations and Assumptions

Out of nine Project affected settlements, six residential areas were visited by the Consultant as a part of the site visits conducted in January and July 2024. During these site visits conducted within the scope of ESIA and CDP and the existing situation in the villages was generally understood. All villages classified as primary in terms of impact prioritisation from the Project were visited. Only the villages that are located on the edge of the access road were not interviewed. During the field visit, it was understood that critical impacts are not expected in these villages. The Consultant relied on extrapolation of interview results to gain a broader understanding of the overall situation since the villages in the scope of the Project have similar baseline characteristics. Mukhtars from neighbouring villages provided detailed descriptions of the conditions in the villages that could not be visited due to impact prioritization. Similarly, the district agricultural directorate, which oversees agricultural activities and community development in the region, supplied additional insights and data. Analysis of the collected information indicates that the conditions in the unvisited villages are consistent with those in the visited ones. This includes aspects such as agricultural practices, socio-economic status, cultural norms, and community structures.

Additionally, secondary data sources were extensively utilized to supplement the information obtained on-site. These sources included reports, studies, and statistical data that provided a holistic perspective on the broader context. Some of the statistical data was available at district level and these were obtained from the governmental institutions' websites and Turkish Statistical Institute (TurkStat) database; they do not cover certain issues on social environment such as gender aspect, vulnerable groups, workforce distribution, and unemployment rates. Similarly, the statistical data at village level either remain as limited for some indicators (i.e., gender) or are based on estimated/ approximate numbers (i.e., educational level, vulnerable groups, workforce distribution, unemployment rates) since majority of these data were gathered through the verbal statements of the mukhtars or representatives of the governmental authorities rather than the officially registered data.

Through the combined approach of extrapolation from interviews and the use of secondary data, the potential information gaps resulting from limited information obtained from site visit were effectively mitigated. This ensured that the findings and conclusions derived from the assessment were as comprehensive and accurate as possible.

13.2.4 Social Receptors and Area of Influence (AoI)

Sivas is the Project affected province located in the Central Anatolian Region of Türkiye. The desktop studies that were conducted as per the documents shared by the Project Company concluded that the social AoI of the Project covers a total of nine villages. These are the six closest villages to the Project area and turbine locations including Çiçekyurt, Kürkçü, Davulhüyük, Koyunlu, Reşadiye, and Yılanhüyük; three closest villages to the planned access road including İncesu, Kaşköy, and Kızılpınar. General socioeconomic structure in the Project affected districts and villages are provided in below.

Table 13.1: Affected district and villages

District	Village	Distance to the nearest turbine (km)
Gürün	Çiçekyurt	2.22
	Kürkçü	3.87
	Davulhüyük	4.95
	Koyunlu	5.17

District	Village	Distance to the nearest turbine (km)
	Reşadiye	4.40
	Yılanhüyük	3.15
	İncesu	9.06
	Kaşköy	11.90
	Kızılpınar	6.84

Source: The Project Company

A site visit was held by the Consultant in January 2024. During the site visit, baseline information on the villages affected by the construction and operation phases of the Project was collected.

The positive social impacts of the Project will be on local infrastructural capacity improvements such as improving the access roads of the settlements while increasing the domestic generation capacity of clean energy on a country basis. In addition, it can be considered to contribute economically to the surrounding businesses with the products and services to be allocated locally. In case of need in terms of recruitment, employment opportunities can be provided to people residing in the surrounding villages and actively looking for work provided that they meet the necessary technical and legal requirements of the work. Positive impacts are also related to the infrastructural developments (i.e., improvements on the road quality, water supply network), improvements on the social facilities in the nearby villages (i.e., school, social centre for weddings and funerals) and social projects (i.e., trainings and scholarship opportunities) of the Project Company to be developed in the future can create positive outcomes in the social environment.

The major adverse impacts of the Project during the construction phase are assessed as land acquisition and community health and safety risks including ice throw, road traffic safety, waste, noise and dust. Specifically, dust, noise, and increased traffic volume are likely to occur during construction phase whereas noise and visual impacts can be observed during operation phase. Within the scope of the Project, transaction will be carried out on several private lands. However, the main impact of land acquisition will occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands near the Project affected villages. Detailed analysis is given in Section 13.4.

Accordingly, the direct social receptors of the Project during the construction and operation phases are as follows:

- Local community members whose land is leased by the Project Company and subsequently expropriated,
- Local community members whose livelihoods mainly based on animal husbandry have the potential to be affected due to public pasture lands use and acquisition,
- Local community members who are on the access roads to the Project area and/or use these roads, and are likely to be exposed to increased traffic volume and road safety risks,
- Local community members who may benefit from the Project's local employment opportunities,
- Vulnerable groups who may be in need for essential consultation in the Project, and
- All construction phase workers employed within the scope of the Project (including subcontractors), and operation phase personnel.

The Table 13.2 below summarizes the communities located within the social AoI and the potential adverse impacts during the construction and operation phases of the Project.

Table 13.2: Communities located within the Social Area of Influence (AoI) phases of the Project

Village	General information on the Location	Impact Prioritization	Potential Adverse Impacts
Gürün District			
Çiçekyurt	Located to the south of the nearest turbine (T01) and the distance from the village centre to the turbine is approximately 2.2 km. The access road is near the village.	Primary	Within the scope of the Project, nine different private parcels have been leased and for eight of them the expropriation process will take place. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Çiçekyurt village will be relatively the settlement where the highest impact will be observed during the construction phase due to its proximity to construction site and access road. Although the access road to the site passes through the village, residents of the village are not expected to be exposed to adverse impact regarding dust as detailed in *Chapter 7: Air Quality*. However, it is expected that there will be a noise related adverse impacts as detailed in *Chapter 9: Noise and Vibration*.
Kürkçü	Located to the north of the nearest turbine (T02) and the distance from the village centre to the turbine is approximately 3.87 km.	Primary	Within the scope of the Project, no transaction will be carried out on any private parcel in the settlement. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Davulhüyük	Located to the south of the nearest turbine (T01) and the distance from the village centre to the turbine is approximately 4.95 km.	Primary	Within the scope of the Project, no transaction will be carried out on any private parcel in the settlement. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Koyunlu	Located to the north of the nearest turbine (T06) and the distance from the village centre to the turbine is approximately 5.17 km.	Primary	Within the scope of the Project, no transaction will be carried out on any private parcel in the settlement. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Reşadiye	Located to the south-east of the nearest turbine (T09) and the distance from the village centre to the turbine is approximately 4.40 km.	Primary	Within the scope of the Project, no transaction will be carried out on any private parcel in the settlement. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Yılanhüyük	Located to the south-east of the nearest turbine (T14) and the distance from the	Primary	Within the scope of the Project, no transaction will be carried out on any private parcel in the settlement. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas,

Village	General information on the Location	Impact Prioritization	Potential Adverse Impacts
	village centre to the turbine is approximately 3.15 km.		which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
İncesu	Located to the south of the nearest turbine (T01) and the distance from the village centre to the turbine is approximately 9.06 km.	Secondary	The village was included in the scope of ESIA due to the proximity of the site access road. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Kaşköy	Located to the south of the nearest turbine (T01) and the distance from the village centre to the turbine is approximately 11.9 km.	Secondary	The village was included in the scope of ESIA due to the proximity of the site access road. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.
Kızılpınar	Located to the south-west of the nearest turbine (T01) and the distance from the village centre to the turbine is approximately 6.84 km.	Secondary	The village was included in the scope of ESIA due to the proximity of the site access road. Residents of the village are not expected to be exposed to community health safety risks such as dust or noise as detailed in *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*.

Figure **13.1** below shows the Project area and the centers and residential areas of the villages in the vicinity, which constitute the social impact area of the Project.

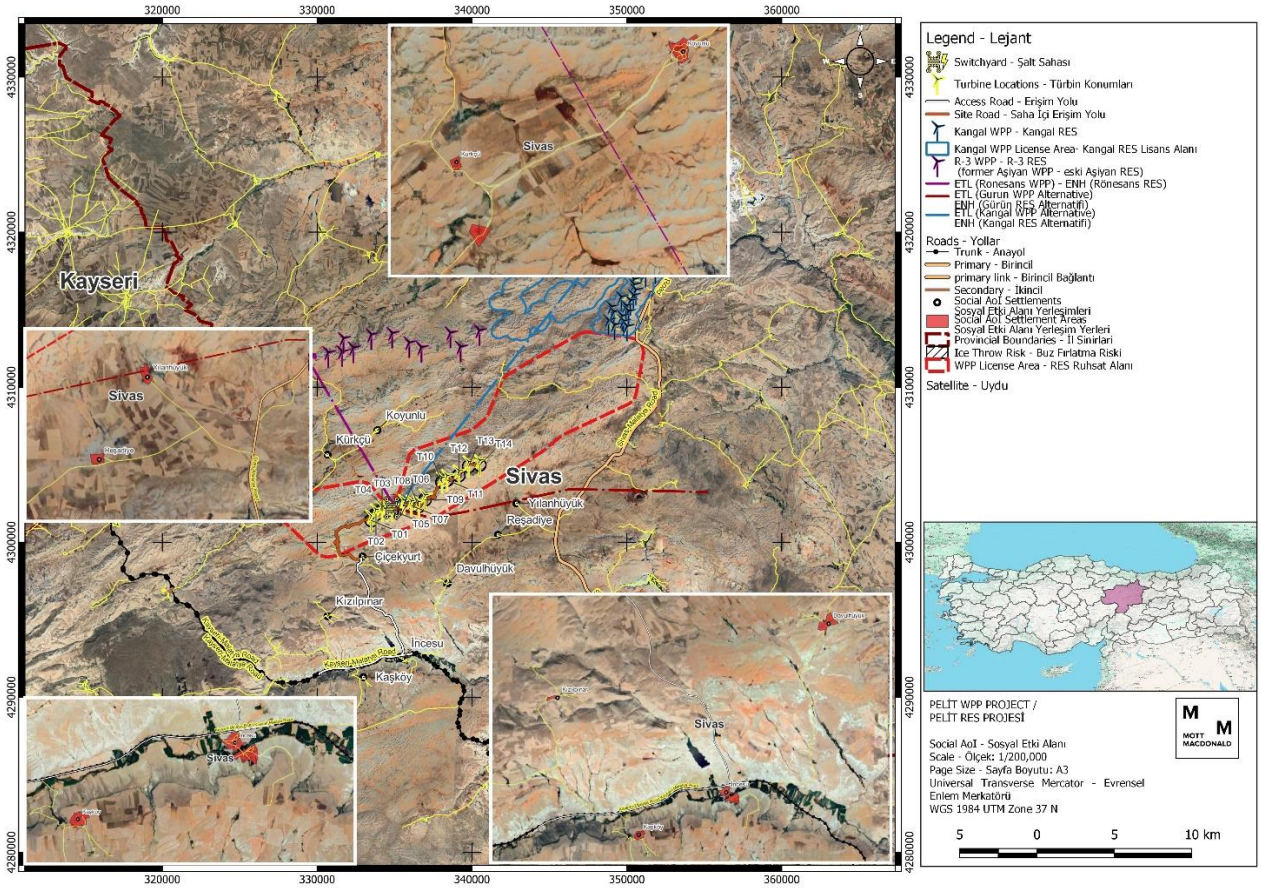


Figure 13.1: Project's area of influence for social impacts

13.3 Baseline Conditions

13.3.1 Population and Population Changes

13.3.1.1 Gürün District

Gürün district is one of the 17 districts of Sivas. Gürün district, with a population of 18,118 in 2023, is the eighth most populated district in Sivas. Population density of Gürün district was 7.0 person/km^2 in 2023. There has not been a significant increase in the population of the district in the last 10 years. The male population ratio in the total population is 50.86%, while the female population ratio is 49.14%.[138] Average household size was 2.99 in 2023.[139] Table 13.3 given below shows the population of Gürün district by years.

[138] TurkStat, 2023 Statistics on Population. Retrieved from https://biruni.tuik.gov.tr/medas/?locale=tr on 26 June 2024.

[139] Endeksa, 2023 Statistics on Population. Retrieved from https://www.endeksa.com/tr/analiz/turkiye/sivas/gurun/demografi on 26 June 2024.

Table 13.3: Population of Gürün district by years

Years	Total	Male	Female
2023	**18,118**	9,215	8,903
2022	**18,009**	9,070	8,939
2021	**18,286**	9,220	9,066
2020	**18,700**	9,450	9,250
2019	**18,771**	9,495	9,276
2018	**19,076**	9,618	9,458
2017	**18,520**	9,270	9,250
2016	**18,842**	9,438	9,404
2015	**19,135**	9,562	9,573
2014	**19,843**	9,913	9,930
2013	**19,954**	10,034	9,920

Source: TurkStat, 2023 Statistics on Population[140]

Population growth rate of Gürün district in 2023 was 0.61%. There have been minor fluctuations in the rate of population growth throughout the years. The following

Figure 13.2 shows the population growth rate of Gürün district throughout the years.

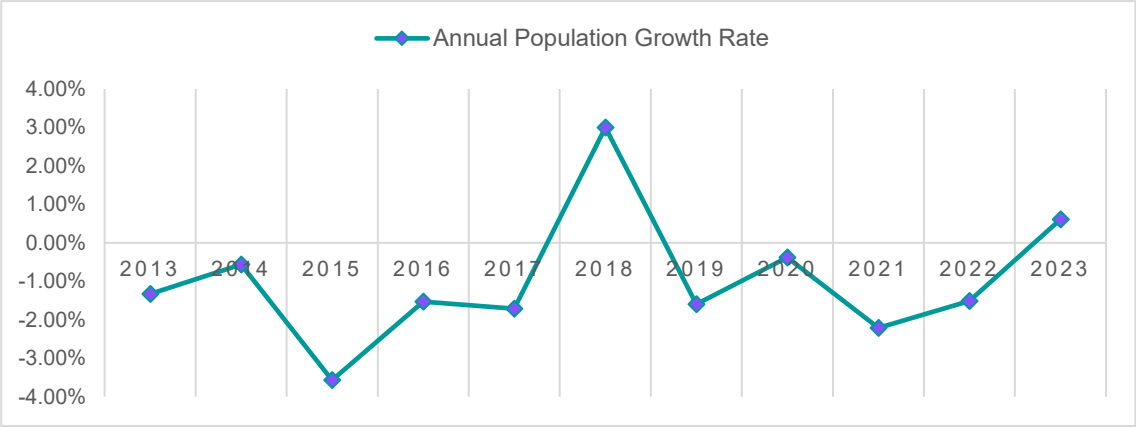


Figure 13.2: Population growth rate of Gürün district by years
Source: TurkStat, 2023 Statistics on Population[141]

Table 13.4 given below summarizes the population of Project affected villages in Gürün district by gender.

Table 13.4: Population of the Project affected villages of Gürün district (2023)

Name of the villages	Total population	Male	%	Female	%
Çiçekyurt	21	13	61.9	8	38.1
Kürkçü	15	10	66.6	5	33.4

[140] TurkStat, 2023 Statistics on Population. Retrieved from https://biruni.tuik.gov.tr/medas/?locale=tr on 26 June 2024.

[141] TurkStat, 2023 Statistics on Population. Retrieved from https://biruni.tuik.gov.tr/medas/?locale=tr on 26 June 2024.

Davulhüyük	211	100	47.4	111	52.6
Koyunlu	96	58	60.4	38	39.6
Reşadiye	30	16	53.3	14	46.7
Yılanhüyük	74	35	47.3	39	52.7
İncesu	174	91	52.3	83	47.7
Kaşköy	45	25	55.5	20	44.5
Kızılpınar	31	15	48.4	16	51.6

Çiçekyurt village is approximately 2.22 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 21. The male population rate is 61.9% while the female population rate is 38.1%. There are seven households in total in the village. As reported by the mukhtar during the site visit in January 2024, the population generally decreases to four-five households in winter season. It was stated that the young population in the village is quite low. As reported by the mukhtar, main reasons of the population decrease and migration in the village are related to more education and employment opportunities in the districts and provinces.

Kürkçü village is approximately 3.87 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 15. The male population rate is 66.6% while the female population rate is 33.4%. There are three households in total in the village. At the time of the site visit in January 2024, only the mukhtar’s household was staying in the village. As reported by the mukhtar, the number of households can increase up to ten in summer season with the arrival of local people for holiday.

Davulhüyük village is approximately 4.95 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 211. The male population rate is 47.4% while the female population rate is 52.6%. There are around 43 households in total in the village.

Koyunlu village is approximately 5.17 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 96. The male population rate is 60.4% while the female population rate is 39.6%. There are around 20 households in total which increases to 25-30 in summer season. As reported by the mukhtar during the site visit in January 2024, the young is quite high in the village.

Reşadiye village is approximately 4.40 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 30. The male population rate is 53.3% while the female population rate is 46.7%. It is stated that there are around five households in total, which increases to 20 in summer decreases to one or two in winter. The mukhtar of the village stated that the young population is quite high in the village and there are no residents who work outside the village.

Yılanhüyük village is approximately 3.15 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 74. The male population rate is 47.3% while the female population rate is 52.7%. There are around 20 households in winter and around 30 households in summer in the village. As reported by the mukhtar during the site visit in January 2024, the youth population is quite high in the village.

İncesu village is approximately 9.06 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 91. The male population rate is 52.3% while the female population rate is 47.7%.

Kaşköy village is approximately 11.90 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 45. The male population rate is 55.5% while the female population rate is 44.5%.

Kızılpınar village is approximately 6.84 km distance to the nearest turbine in the Project area. The total population of the district in 2023 was 31. The male population rate is 48.4% while the female population rate is 51.6%.

13.3.2 Education Services

13.3.2.1 Gürün District

There is one kindergarten in Gürün district. The number of primary schools and high schools are noted as seven and five in 2023, respectively. There is also a Public Education Centre and a Teacher Training Centre and Evening Art School within the district. [142] Table 13.5 given below summarizes the educational level of the residents in Gürün district.

Table 13.5: Education rates in Gürün District (%)

Education level	Population (%)
Illiterate	5.6
Literate/ not graduate	9.9
Primary school	52.4
High school	18.2
University or higher degree	12.9
Unknown	1
Total	**100**

Source: Endeksa, Statistics on Educational Levels (2023)[143]

83.5% of the total population in Gürün district has at least a primary school degree, which shows average rates of literacy in the region. Less than one in each 10 people is within the category of “literate but do not have a diploma” whereas the illiterate people constitute more than 5% of the population.

There are no schools in the Project affected villages in Gürün district except for the Koyunlu village. There is a primary school in the Koyunlu village with less than 10 students in total. It was stated by the mukhtar of the Çiçekyurt village that the village school was closed in 2008 and students go to boarding school in the Gürün district. As reported by the mukhtar, main reasons of the population decrease and migration in the village are related to more education and employment opportunities in the districts and provinces. It was stated by the mukhtar that there are around 10 students residing in the Yılanhüyük village. Students receive education through mobile education to the Gürün district centre. The departure time of the students was reported by the mukhtar as 07:30 and they return to the village around 16:30.

Desktop studies cannot provide sufficient information on educational services in the İncesu, Kaşköy, and Kızılpınar villages. On the other hand, limited time to complete the site visit studies remained as a limitation to receive detailed data on educational services.

[142] Gürün District Directorate of National Education, 2023. Educational Institutions Statistics. Retrieved https://gurun.meb.gov.tr/ on 26 June 2024.

[143] Endeksa, 2023 Statistics on Educational Levels. Retrieved from https://www.endeksa.com/tr/analiz/turkiye/sivas/gurun/demografi on 26 June 2024.

13.3.3 Land Use and Ownership of Assets

The area where the Project is located is generally used for agricultural activities, animal husbandry activities and pasturage. The surrounding villages use the land for grazing animals and planting limited crops when favourable conditions are provided. Completely dry agricultural lands such as barley, wheat, chickpea is observed around the Project licence area. Most of the products obtained from agriculture are used as feed in animal husbandry.

According to the information obtained from the National EIA, the soils where the turbines and switchyard will be located within the scope of the Project are defined as brown soil. These are generally arid and semi-arid climates, consisting of shrubland areas where short grasses grow. In terms of general land use, it is considered as land unsuitable for agriculture in terms of soil cultivation. It is eroded and has a high slope.

13.3.3.1 Project's Land Use

The Project had been initially planned to involve 20 turbines. However, a design revision was considered for the Project in order to increase the efficiency. Accordingly, the number of turbines has undergone a revision and has been reduced from 20 to 14 with the cancellation of six turbines while the unit power of wind turbines to be constructed has increased from 4 MW to 5.9 MW. In the last case, there is a land utilisation of 14 turbines. The total installed power capacity of the Project once more remained the same as 80MWe/80MWm ([13x 5.7MWm/5.7Mwe] + [1x 5.9MWm/5.9Mwe]).

Land Acquisition Plan prepared by the Project Company issued on 28 February 2023 includes the policies, standards and requirements of reference that are applicable, but not limited to, for the Project during all phases. In this context, the table below summarises the national standards and regulations followed for the Project.

Table 13.6: National standards and regulations

Title	Off. Gaz. Number/ Date
Constitution of the Republic of Turkey *There are no direct constitutional principles for resettlement in Turkey. However, Articles of the Constitution (especially 44,45 and 46) indirectly relate to resettlement activities.*	17863, 9/11/1982
Expropriation Law (Law No: 2942), as amended in 2020	18215, 04/11/1983
Forest Law (Law No. 6831)	9402, 08/09/1956
Pasture Law (Law No. 4342)	23272, 28/02/1998
Cadastral Law (Law No. 3402)	19512, 09/07/1987
Land Registry Law (Law No. 2644)	2892, 29/12/1934
Agricultural Reform Law on Land Arrangement in Irrigated Areas (Law No. 3083)	18592, 01/12/1984
Law on Soil Protection and Land Use (Law No. 5403)	25880, 19/07/2005

Source: The Project Company, Land Acquisition Plan

During the site visit in January 2024, the Project Company representatives shared the latest information about the land acquisition processes of the Project. The table below demonstrates locations of the 14 turbines which all have N163 model title, 5.9 MW power and 163 m turbine rotor wing diameter. The turbines are located in Gürün district and cover a total area of 256,217.73 m^2.

Table 13.7: Final planned turbine locations and parcel information

Turbine Number	To East / X (m)	To North / Y (m)	Block	Parcel	Area (m^2)	Altitude (m)
T01	37.0814806	38.84563389	104	142	19,533.70	2,160.00
T02	37.0848498	38.84932042	104	146	18,138.27	2,170.00
T03	37.0893436	38.85147546	104	143	18,439.97	2,190.00
T04	37.0931423	38.85161866	104	144	18,310.70	2,200.00
T05	37.0969636	38.85178013	104	145	17,647.84	2,200.00
T06	37.1055384	38.85519038	104	149	18,372.17	2,240.00
T07	37.1111494	38.85479473	104	153	18,677.44	2,270.00
T08	37.1165179	38.85441292	104	157	18,729.99	2,280.00
T09	37.1211487	38.85841611	104	158	18,594.97	2,260.00
T10	37.1334975	38.86874199	104	159	18,772.01	2,270.00
T11	37.1373145	38.86999234	104	160	18,258.16	2,270.00
T12	37.1458744	38.87280472	104	162	18,413.67	2,273.00
T13	37.1531556	38.87828139	104	129	15,965.28	2,320.00
T14	37.1612817	38.8792026	101	25	18,363.56	2,280.00

Source: The Project Company, Pelit WPP Coordinate List

There will be a land allocation process prior to the construction activities for the realization of the Project. When the scope of the planned transaction process is examined, it is seen that the lands required for the Project including construction of turbines are in the status of pastureland. Private lands will be used for the access road and temporary mobilization facility.

In the light of the documents provided by the Project Company, the scope of public lands to be used in the construction process of the Project consists of 42 pasturelands registered in the name of the Treasury. For the turbine areas here, a grazing fee per acre was deducted and a 20-year grazing fee was paid. In accordance with this, the table below shows the distribution of land acquisition and number of parcels with breaking down into villages.

Table 13.8: Land transactions by villages

Village	# of parcels to be utilized for the Project
Koyunlu	22
Davulhüyük	3
Kürkçü	1
Çiçekyurt	10
Yılanhüyük	5
Reşadiye	1
Total	**42**

Source: General Directorate of National Real Estate, list of title deeds

Detailed information on the parcels, usage areas and sizes of public lands is given in the table below.

Table 13.9: Details of 42 Public Parcels within the Scope of the Project

No	Turbine	Purpose of Use	Village	Area (m^2)	Block	Parcel	Usage Type	Acquisition Status	Grazing Land Block	Grazing Land Parcel
1		Switchyard	Kürkçü	2,709.69	109	3	Easement	The Declaration Is Being Renewed	109	1
2		Switchyard	Koyunlu	5,920.55	104	148	Easement	The Declaration Is Being Renewed	104	122
3		Switchyard	Davulhöyük	492.97	103	116	Easement	The Declaration Is Being Renewed	-	-
4	T20	Turbine	Koyunlu	18,820.46	104	131	Easement	The Declaration Is Being Renewed	104	122
5	T19	Turbine	Koyunlu	18,372.17	104	130	Easement	The Declaration Is Being Renewed	104	122
6	T18	Turbine	Yılanhöyük	18,363.56	101	25	Easement	The Declaration Is Being Renewed	101	21
7		Road	Yılanhöyük	1,796.95	101	26	Rental	The Rental Agreement and Site Handover Have Been Completed	101	21
8		Secondary Road	Koyunlu	26,062.27	104	141	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
9	T17	Turbine	Yılanhöyük	19,796.46	101	24	Easement	The Declaration Is Being Renewed	101	21
10		Road	Yılanhöyük	832.34	101	27	Rental	The Rental Agreement and Site Handover Have Been Completed	101	21
11	T16	Turbine	Koyunlu	15,965.28	104	129	Easement	The Declaration Is Being Renewed	104	122
12	T16	Turbine	Reşadiye	1,513.94	101	155	Easement	The Declaration Is Being Renewed	101	153
13	T16	Turbine	Yılanhöyük	1,073.50	101	23	Easement	The Declaration Is Being Renewed	101	21
14	T15	Turbine	Koyunlu	18,808.41	104	136	Easement	The Declaration Is Being Renewed	104	122
15	T14	Turbine	Koyunlu	18,413.67	104	162	Easement	The Declaration Is Being Renewed	104	122

No	Turbine	Purpose of Use	Village	Area (m^2)	Block	Parcel	Usage Type	Acquisition Status	Grazing Land Block	Grazing Land Parcel
16		Secondary Road	Koyunlu	3,918.94	104	147	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
17	T13	Turbine	Koyunlu	18,836.87	104	161	Easement	The Declaration Is Being Renewed	104	122
18		Secondary Road	Koyunlu	11,414.60	104	150	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
19	T12	Turbine	Koyunlu	18,258.16	104	160	Easement	The Declaration Is Being Renewed	104	122
20		Road	Koyunlu	534.22	104	155	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
21	T11	Turbine	Koyunlu	18,772.01	104	159	Easement	The Declaration Is Being Renewed	104	122
22		Secondary Road	Koyunlu	31,984.06	104	152	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
23	T10	Turbine	Koyunlu	18,594.97	104	158	Easement	The Declaration Is Being Renewed	104	122
24	T09	Turbine	Koyunlu	18,729.99	104	157	Easement	The Declaration Is Being Renewed	104	122
25		Road	Koyunlu	5,731.89	104	151	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
26	T08	Turbine	Koyunlu	18,677.44	104	153	Easement	The Declaration Is Being Renewed	104	122
27		Road	Koyunlu	5,701.28	104	154	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
28	T07	Turbine	Koyunlu	18,372.17	104	149	Easement	The Declaration Is Being Renewed	104	122
29		Road	Koyunlu	6,765.65	104	156	Rental	The Rental Agreement and Site Handover Have Been Completed	104	122
30	T06	Turbine	Koyunlu	17,803.00	104	137	Easement	The Declaration Is Being Renewed	104	122
31		Road	Davulhöyük	3,023.46	103	117	Rental	The Rental Agreement and Site Handover Have Been Completed	103	113

No	Turbine	Purpose of Use	Village	Area (m^2)	Block	Parcel	Usage Type	Acquisition Status	Grazing Land Block	Grazing Land Parcel
32	T05	Turbine	Davulhöyük	219.72	103	119	Easement	The Declaration Is Being Renewed	103	113
33	T05	Turbine	Çiçekyurt	17,647.84	104	145	Easement	The Declaration Is Being Renewed	104	139
34		Road	Çiçekyurt	6,220.64	104	151	Rental	The Rental Agreement and Site Handover Have Been Completed	104	139
35	T04	Turbine	Çiçekyurt	18,310.70	104	144	Easement	The Declaration Is Being Renewed	104	139
36		Road	Çiçekyurt	4,744.99	104	147	Rental	The Rental Agreement and Site Handover Have Been Completed	104	139
37	T03	Turbine	Çiçekyurt	18,439.97	104	143	Easement	The Declaration Is Being Renewed	104	139
38		Road	Çiçekyurt	3,756.10	104	148	Rental	The Rental Agreement and Site Handover Have Been Completed	104	139
39	T02	Turbine	Çiçekyurt	18,138.27	104	146	Easement	The Declaration Is Being Renewed	104	139
40		Road	Çiçekyurt	33,345.48	104	150	Rental	The Rental Agreement and Site Handover Have Been Completed	104	139
41		Road	Çiçekyurt	2,617.95	104	149	Rental	The Rental Agreement and Site Handover Have Been Completed	104	139
42	T01	Turbine	Çiçekyurt	19,533.70	104	142	Easement	The Declaration Is Being Renewed	104	139

The total values in the table above are as follows:

Table 13.10: Total Areas of Public Lands

Transaction Type	Area (m^2)
Easements for Switchyard	9,123.21
Easements for Turbines	371,462.26
Rentals for Roads	148,450.82
Total	**529,036.29**

Each of the title deeds of 42 different public parcels to be utilized within the scope of the Project are provided in Appendix B.

The Project will require the expropriation of 8 parcels owned by 13 landowners. Since these parcels cannot be divided according to the title deeds, the areas needed for the Project will be expropriated. Additionally, during the building license process, it is necessary to change the land qualification of the access roads to the Project site to accommodate the cadastral road request. The total area to be expropriated is 1,258.38 m^2. In addition, a mobilisation facility was established on another private parcel with a two-year lease agreement. The table below summarises the operations carried out on these private parcels.

Table 13.11: Private Lands Used as Access Road and Mobilisation Facility within the Scope of the Project

Village	Block	Parcel	Total Area (m^2)	Area to be Used (m^2)	# of Shareholder	Expropriation	Purpose of Use
Çiçekyurt	117	72	5,184.15	936.00	1	Will be carried out	Access Road
	117	33	13,105.36	1,158.00	1	Will be carried out	Access Road
	117	32	12,333.33	1,556.00	1	Will be carried out	Access Road
	117	73	5,113.61	35.00	1	Will be carried out	Access Road
	104	17	14,565.86	647.00	2	Will be carried out	Access Road
	104	18	14,122.22	2,813.00	7	Will be carried out	Access Road
	104	9	18,652.20	2,001.00	1	Will be carried out	Access Road
	104	6	5,552.00	921.00	1	Will be carried out	Access Road
	104	115	20,000.00	20,000.00	NA	Will not be carried out	Mobilization Facility (Temporary)

Regarding ETL, the produced electricity will be transferred to northeast of the Project licence area. This is roughly 11 kilometres from the projected switchyard location which is in between T05 and T06. Within the scope of ETL construction, land acquisition procedures of the Project Company are still ongoing. The parcels and landowners on the ETL route have not been finalised. The Final ESIA will provide information on the completed design of the ETL construction, and an impact analysis will be conducted accordingly.

13.3.3.2 Acquisition of Private Lands

There is currently no private land acquisition process planned within the scope of the Project. However, activities such as widening and arrangement of roads within the scope of access road works and ETL construction, especially around the villages, may require the use of private parcels. In light of these possibilities, the Project Company will carry out the private parcel acquisition process as follows.

The main purpose for privately owned lands in land acquisition is negotiated agreement (individuals affected by a Project willing to sell their property and assets on a voluntary basis). In cases where the consent purchase cannot be realized, expropriation will be made in accordance with the Expropriation Law No. 2942.

There are no forest lands required by the Project. During the expropriation of agricultural lands, the characteristics of these areas will be identified per the Soil Conservation and Land Use Law No. 5403, the Pasture Law No. 4342, and the Aquatic Products Law No. 1380.

Project construction could be only conducted after the owner or users are offered a compensation package in line with the requirements of IFC PS5 and EBRD RP5, and the compensation is paid.

There are five acquisition types of the lands to be obtained which are listed below:

- **Willing Buyer- Willing Seller / Negotiated Settlement:** Purchase of lands at market price with the consent of the owners. Consensual land purchases on all eligible parcels are prioritised by the Project Company.
- **Deed of Consent (Muvafakatname in Turkish):** Even though the expropriation process has not been completed, some lands can be entered with a deed of consent from the owners.
- **Permanent Acquisition or Ownership Right:** Ownership rights mean permanent land acquisition. The land expropriation is permanent, and the ownership right is registered under the name of the administration which is Energy Market Regulatory Authority (EMRA). Since a permanent facility will be built on the transferred land, the former owner cannot use the land.
- **Permanent Easement Right:** The parcel is not divided; this right keeps the original owner as title deed holder but establishes right (as annotation) in favour of the EMRA. Since the permanent facility (tunnels or viaducts) passes under or above the transferred land, the landowner will be able to continue using the land with certain restrictions (such as not being able to build houses).
- **Land Rentals through Lease Contracts:** In case of any temporary land need (e.g., for the camp site, storage area) land can be rented for a certain period under the terms and rates mutually agreed between the Contractor and the landowner. After the contract expires, the land will be reinstated and returned to its owner in its original condition.

13.3.3.3 Urgent Expropriation

According to Turkish soil conservation law, agricultural parcels cannot be divided into units smaller than 120 decares, except through expropriation initiated by a public benefit decision.

Ownership information of any parcels can only be submitted to the Project Company with such a decision.

The project involves the expropriation of eight parcels owned by 13 landowners. Currently, the Project is in the stage of preparing the expropriation plan for the leased parcels. All affected landowners have agreed to temporarily lease their land during this preparation period. Compensation is determined based on agricultural values: land with crops receives 10,000 TL per acre, while land without crops receives 7,000 TL per acre. Additionally, the base rate for wheat production stands at 4,000 TL per acre. In case of objections to the announced expropriation prices, the Project Company aims to negotiate and offer a higher average price. The entire expropriation process was explained to the owners in detail. As of now, none of the landowners in Çiçekyurt village have expressed intent to object to the expropriation process.

Law and Regulations

According to the Turkish legislation, the land acquisition, expropriation, and urgent expropriation processes are based on the Expropriation Law No. 2942 (Official Gazette (OG) Date/Number: 08.11.1983/18215) and relevant laws concerning amendments to the Expropriation Law.

Article 27 of the Expropriation Law authorizes the organization responsible for expropriation to confiscate the immovable assets required by the project earlier than the time needed in normal expropriation procedure. This process does not prevent challenges of the property owners against the determined valuation. If the urgent expropriation is unavoidable, right owners (displaced persons) should be meaningfully informed about the expropriation of needed immovable properties and initial compensation at initial phase of land acquisition by responsible agency.

Pursuant to Article 15, it is compulsory to form a committee of experts of at least three persons, depending on the type and nature of the land to be expropriated. One of the experts must be chosen from among experts with a master's degree or doctorate in real estate development or from among real estate appraisers authorised in accordance with the Capital Market Law of 6 December 2012, number 6362.

The decision of the court to seize the immovable property shall be notified to the land registry office. The provision that the immovable property cannot be transferred, alienated, or assigned to another person shall be annotated in the land registry.

Project Specific Urgent Expropriation Procedure (UEP)

The steps of the UEP process for the Company are as listed below.

- The investor applies to the relevant public authority/administration which is Energy Market Regulatory Authority (EMRA), i.e., a regulatory agency or local government, for urgent expropriation of immovable properties on which the project will be located.
- A "Public Interest Decision" (PID) is taken by the EMRA as a requisite for requesting the Presidency to take an "Urgent Expropriation Decision". The PID is to be approved by the local government where the Project is located.
- An "Urgent Expropriation Decision" is issued by the Presidency, affective by the Official Gazette publication date.
- The EMRA conducts another decision for the start of expropriation process, i.e. UEP and prepares or have others to carry out a scaled plan (which is called expropriation plan) including borders, surface area and type of immovable properties or resources and list of owners or possessors of such properties in case there exist no registered title deed and their addresses. In practice, administrations make this plan prepared by the private sector investors.

- The EMRA requests the local civil court of first instance to initiate the immediate seizure of the target property (*First Lawsuit*).
- The local civil court establishes a valuation committee who determines the price within seven days. The EMRA deposits the determined amount in the name of the owner. The usual practice is that the requesting private entity investor covers the cost of expropriation.
- Local civil court notifies/invites the owner either in writing (if the contact addresses of the owners available) or via newspaper announcement. Such an announcement includes information about the bank where the money has been transferred.
- At this stage, the parties can reach an agreement. If an agreement is signed, the expropriation process is completed with the payment of the agreed price and the registration of the property in the name of the public authority at the local Title Deed Registry. If not, the process continues with EMRA's appeal to court for completing the expropriation process pursuant to Article 10 of the Expropriation Law (*Second Lawsuit*).
- However, regardless of whether or not an agreement is reached, seizure is made after the amount specified is deposited by the EMRA in the name of the owner. Following the seizure order of the court, utilization rights is formalized between the public authority and private entity investor. The investor can begin to utilize the relevant target property.
- If needed, the EMRA entitles the Execution Office under local Administration of Justice to evacuate immovable property within 15 days. In practice, administrations and investors try to execute a peaceful evacuation process by informal consultation and assistance. In case of the cultivated land to be evacuated, the cost of the crop is compensated before evacuation.

The land geometry within the wind farm area is governed by regulations. All parcels must be connected to a road, and the entire blade-sweeping area must be granted through a constitution of servitude. Despite this legal requirement, certain portions of the land are technically unnecessary and continue to be used for agriculture by previous owners. In cases where the majority of a parcel is needed for the turbine construction, landowners may request that the Project Company purchase the entire parcel. This occurs when the leftover parcel geometry is unsuitable for agricultural purposes. As a result, the Project Company has acquired three parcels using this approach.

13.3.3.4 Change of Pasture Allocation Purposes

Pasturelands are the areas allocated for grazing animals and using their grass, or traditionally used for these purposes. All of the lands within the scope of the Project have gone through the process of change of pasture allocation.

According to Law No. 4342 "Pasture Law," pastures are:

- Under the rule and disposal of the state.
- Cannot be transferred to private ownership and cannot be used for purposes other than their intended use.
- Not subject to the statute of limitations.
- Boundaries cannot be reduced, but usage rights can be leased.
- The allocation purpose can be changed when necessary.

The purpose of allocation of pastures can be changed in the following cases:

- For essential mining and petroleum activities upon the request of the Ministry of Energy and Natural Resources, after the reserve is determined through exploration activities.
- For essential tourism investments upon the request of the Ministry of Culture and Tourism.
- For necessary public investments.
- For the preparation of village settlement areas, implementation zoning plans, additional zoning plans, soil conservation, protection of gene resources, establishment of national

parks and conservation forests, protection of natural, historical, and cultural assets, flood control, regulation of streams and sources, production of aquatic products needed in these sources, and agricultural production activities based on thermal energy.

- For uses required under Articles 13 and 14 of Village Law No. 442.
- For national security and emergency situations.
- For settlement areas in natural disaster regions.
- For petroleum transmission activities and electricity and natural gas market activities upon the request of the Energy Market Regulatory Authority.
- For technological greenhouses based on geothermal resources.

The official procedures required for changing the purpose of allocation of pastures follow the following order:

- The relevant directorate requesting the change in allocation purpose submits a request to the Provincial Directorate of Food, Agriculture, and Animal Husbandry, along with documents specifying the purpose and size of the request and other required documents.
- As per the Prime Ministry Circular dated 15.06.2012 and numbered 2012/15, this request is submitted for the approval of the Prime Ministry.
- The Pasture Commission assigns a technical team and requests an opinion from the Directorate of National Estates regarding this matter.
- The assignment of the technical team, the preparation of the pasture inspection report by the technical team, and the submission of this report to the Pasture Commission are completed within 30 days at the latest.
- If the report prepared by the technical team for the area for which the change in allocation purpose is requested is positive, the twenty-year grass revenue is also determined by a report and submitted to the Pasture Commission.
- If the work cannot be completed within this period, the reason and the date the work will commence are notified in writing to the license holder and the relevant directorate or general directorate.
- After the opinion of the Directorate of National Estates is received by the Provincial Directorate of the Ministry, the Pasture Commission makes its decision within 15 days, together with the inspection report and the opinion of the Directorate of National Estates and submits the decision for the approval of the Governorate.
- Upon the favourable opinions of the Pasture Commission and the Directorate of National Estates, the allocation purpose of all or part of the requested area can be changed by the Governorate.
- The registrations of areas whose allocation purpose has been changed are made in the name of the treasury, and the registrations of foundation pastures are made in the name of the foundation.

13.3.4 Local Economy, Livelihood Sources and Employment

13.3.4.1 Gürün District

The main sources of income of Gürün district are based on agriculture and animal husbandry. In Gürün, where agricultural activities are carried out in an area of 370 thousand decares, wheat, barley and chickpea are mostly produced. The district is also known for its local apples, apricots, mulberries, and walnuts. In addition, Gürün, which has 14 fish production farms,

carries out animal production with 15,000 cattle, 110,000 small cattle, 110,000 poultry and 13,000 beehives.[144]

Gürün district is ranked 609th among 973 districts in the "Socio-Economic Development Ranking of Districts Research" conducted by the Ministry of Industry and Technology in 2022, whose variables were based on demographics, employment and social security, education, health, finance, competitiveness, innovation, and quality of life. It ranked seventh among the 17 districts of Sivas[145].

The main sources of income of the Çiçekyurt village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and alfalfa. There are 35-40 cattle and 2,500 small cattle in the village. Residents perform forest grazing for animal husbandry. There are no mushroom picking activities carried out. It was stated that one family in the village carries out organic honey production and has approximately 100 hives. It is stated that the agricultural farmers of the village are members of Davulhüyük Agricultural and Credit Cooperative. At the same time, the mukhtar and some villagers stated that they are members of Karacalar Irrigation Union.

The main sources of income of the Kürkçü village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and chickpeas. There are 50 cattle in the village. Residents perform forest grazing for animal husbandry.

The main sources of income of the Davulhüyük village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and chickpeas. There are 500 cattle and 8,000 small cattle in the village. Residents perform forest grazing for animal husbandry.

The main sources of income of the Koyunlu village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and chickpeas. There are 50 cattle and 10,000 small cattle in the village. Residents perform forest grazing for animal husbandry.

The main sources of income of the Reşadiye village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and chickpeas. There are 500 small cattle in the village. Residents perform forest grazing for animal husbandry. There are mobile beekeepers engaged in beekeeping in the areas close to the village.

The main sources of income of the Yılanhüyük village are based on agriculture and animal husbandry. The most cultivated agricultural products are barley, wheat, and chickpeas. There are 60 cattle and 3,000 small cattle in the village. Residents perform forest grazing for animal husbandry. There are a few numbers of mobile beekeepers engaged in beekeeping in the areas close to the village. Mushroom picking activities are carried out for individual consumption.

Agricultural and beekeeping activities carried out in the villages do not intersect within the Project AoI.

Desktop studies cannot provide sufficient information on educational services in the İncesu, Kaşköy, and Kızılpınar villages. On the other hand, limited time to complete the site visit studies remained as a limitation to receive detailed data on educational services.

[144] District Governorship of Gürün, General Information on Gürün District. Retrieved from http://www.gurun.gov.tr/ on 26 June 2024.

[145] Socio-Economic Development Ranking of Districts Research (2022). Retrieved from sanayi.gov.tr/assets/pdf/birimler/2022-ilce-sege.pdf on 26 June 2024.

13.3.5 Infrastructure: Health, Transport, Water Supply and Sewerage

Figure 13.3 below shows the locations of the social infrastructural services (e.g., healthcare institutions, local shops, and mosques) in Project affected villages.

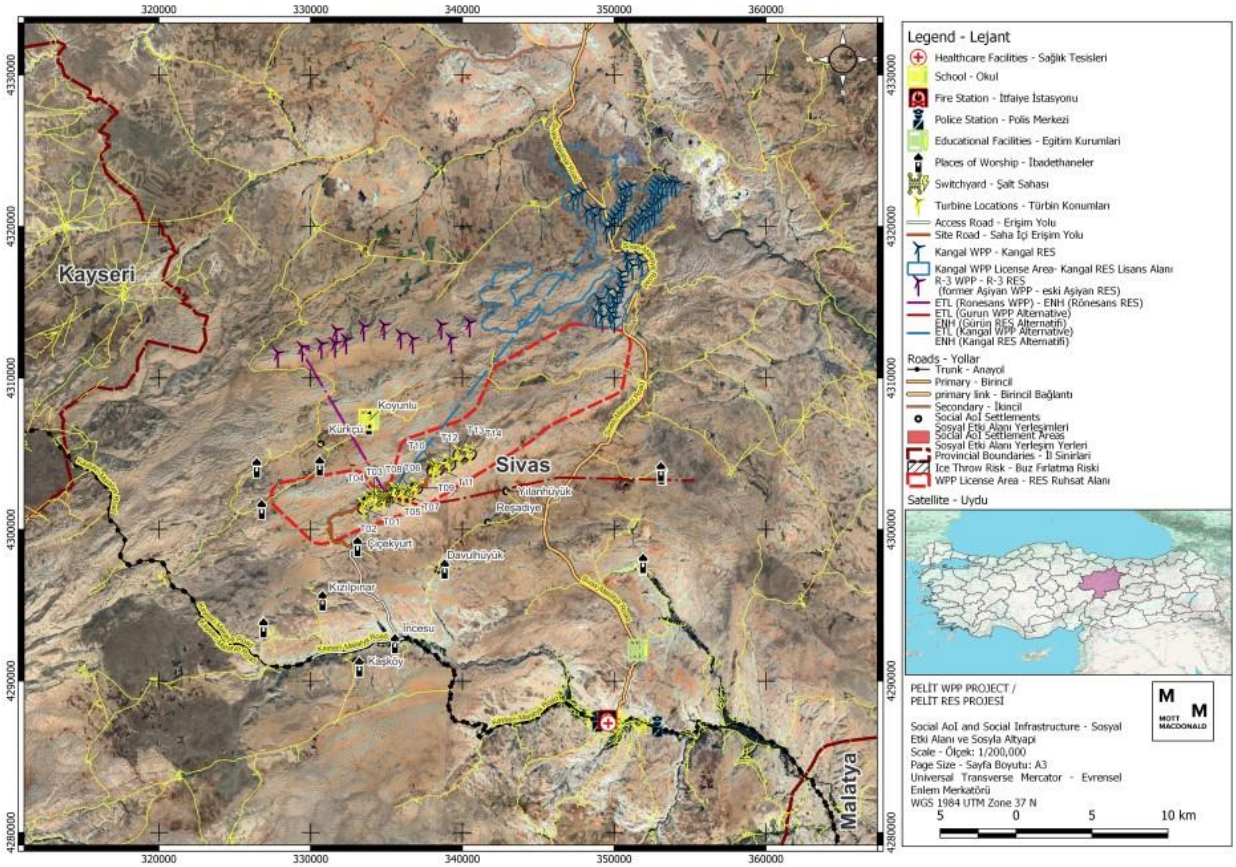


Figure 13.3: Social infrastructural services in Project affected villages

13.3.5.1 Gürün District

There is an electricity network and a landline telephone in the village of Çiçekyurt. It has been stated that mobile phone reception in the village is sufficient, however, there is a shortage of internet infrastructure. The school in the village was closed in 2008; and students go to boarding school in the district. As reported by the mukhtar, main reasons of the population decrease and migration in the village are related to more education and employment opportunities in the districts and provinces.

Although the spring water utilized as a water resource in the area was reported to be adequate during the ESDD studies, the mukhtar and residents during the site visit in January 2024 stated that the water supply network is old and the quality of the waterpipes is poor. In winter seasons, the residents face some problems in accessing to water since bad weather conditions result in waterpipes' bursting or freezing. Residents stated that a water source comes from the rock beneath T1. For more detailed information please see *Chapter 5: Water Quality, Hydrology and Hydrogeology*. Waste disposal is provided by the special provincial administration and is removed once a week. For more detailed information please see *Chapter 11: Waste and Resources*. On the basis of the ESDD findings, the roads providing access to the village are adequate and there has not been reported any current problems except the difficulties faced during the winter. The mukhtar and residents pointed out during the consultations in January

2024 that access roads to the villages are closed in winter due to bad weather conditions. A doctor visits the village every 15 days for general check-ups. In times of emergency, they request an ambulance, or they visit the hospitals in Gürün district, Sivas, Malatya, and Kayseri provinces.

There is an electricity network and a landline telephone in the village of Kürkçü. It has been stated that there is water supply network in the village. There is no sewerage system in the village. There is a septic tank which is emptied regularly by the district municipality. It was stated that there is no doctor who visits the village at regular intervals. Residents also stated that they call 112 or go to Gürün district centre when there is an emergency. The biggest problem of the village is stated as the roads. It is stated that the road between Kürkçü village and Çiçekyurt village, which is 10 km away, is a footpath and this makes transportation difficult. In order to solve this problem, residents of the Kürkçü village requested a group road between villages.

There is an electricity network and a landline telephone in the village of Davulhüyük. It has been stated that mobile phone reception in the village is sufficient, however, there is a shortage of internet infrastructure. Well water utilized as a water resource in the area was reported to be adequate. The village has a sewerage system that is currently working without any problems. Waste disposal is provided by the special provincial administration and is removed twice a week. A doctor visits the village once a week for general check-ups.

There is an electricity network and a landline telephone in the village of Koyunlu. It has been stated that both mobile phone reception and internet infrastructure are sufficient, however, there is a shortage of internet connection in mountainous areas. There is a sewerage system in the village for 15 years. Waste disposal is performed by burning by the residents since there are no containers in village. The roads providing access to the village are inadequate and there has been reported some transportation problems especially in bad weathers similar to the other Project affected villages.

There is no health facility or a doctor who visits the village regularly. Healthcare professionals such as nurses make visits to the village very rarely. There is a primary school in the village with less than 10 students in total.

There is an electricity network and a landline telephone in the village of Reşadiye. It has been stated that mobile phone reception in the village is sufficient, however, there is a shortage of internet infrastructure. ESDD findings point out that well water utilized as a water resource in the area was reported to be adequate. There is no sewerage system in the village which was stated as an important problem of the residents. Waste disposal is performed by burning by the residents in wintertime. A doctor visits the village once a year for general check-ups. The roads providing access to the village are inadequate. It is stated by the local community members that asphalt will be poured on the roads after the clay project carried out by State Water Works (DSI) is completed.

There is an electricity network and a landline telephone in the village of Yılanhüyük. It has been stated that both mobile phone reception and internet infrastructure in the village are sufficient. Well water utilized as a water resource in the area was reported to be adequate. According to the ESDD baseline studies, waste disposal is provided by the special provincial administration; however, it is removed only in summer. The roads providing access to the village are inadequate; however there has been stated that the construction will be started using the budget of the special provincial administration for 2024 in the summer. A doctor visits the village once a month for general check-ups. In a case of emergency, residents go to Gürün district to access healthcare institutions. There is no school in the village and around 8-10 students receive education at the school in Gürün district centre by daily journey. The departure time of the students was reported by the mukhtar as 07:30 and they return to the village around 16:30.

13.3.6 Gender Considerations

As per the Turkish Constitution, women have equal rights with men in terms of access to certain services such as health and education, participation in the labour market, and rights on the lands and inheritance. However, women cannot find the same opportunities as men in Türkiye in many fields of social life.

According to the 2023 Gender Gap Index of the World Economic Forum, Türkiye is the 129th country out of 146 countries depending on the indicators of economic participation and opportunity, educational attainment, health, and survival, and political empowerment[146].

In terms of labour force participation, the rate among women was 32.8% whereas it was 70.3% among men in 2021, which is the most recent data at national level[147]. Unemployment rate for men was 10.7% and 14.7% for women in the same year.

There is also some gender-based inequalities in terms of educational attainment. The illiteracy rate among women who are older than 25 years was recorded as 6.1% and it was 1% for men in 2021[148]. The rate of individuals who are older than 25 and have completed at least one educational level was 87.3% for women and 97.1% for men for the same year.

Türkiye has some areas of improvement in terms of political empowerment as well. While half of the total population in Türkiye is women, the female parliament members constitute only 20% of the whole Turkish parliament as of May 2023[149]. The figure is not very different when the rate of women in local governance is considered. The women's representation in local government has been only 10.1% since 2019[150].

At provincial level, Sivas was ranked as 59th amongst 81 provinces for gender equality according to 2020 Gender Equality Assessment in 81 provinces conducted by TSKB, Tepav and TOBB[151]. This finding illustrates that Sivas province has average gender equality gaps than the overall average of Türkiye; hence, there is still need for progress.

Within the scope of the ESIA studies of the Project, the district or village level data remained limited with the verbal statements of the local community members since there are no officially registered data on gender considerations on the basis of district or village.

At village level, the gender-based division of labour is prominent within the households as per the statements of the consulted local community members and official representatives. Gender-based division of labour fosters gender inequality and leads women to take the unpaid labour responsibilities at home-related duties such as cooking, cleaning, and taking care of the children. In addition, women in these villages provide support for the livelihood activities including harvesting in agriculture and animal husbandry. On the other hand, men are regarded as the breadwinner of the household who has a paid labour outside the house. This pattern was observed among the Project affected villages during the site visit in January 2024. Expectations

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[146] World Economic Forum, Global Gender Gap Report. June 2023. Retrieved from https://www3.weforum.org/docs/WEF_GGGR_2023.pdf on 26 June 2024.

[147] Turkish Statistical Institute, Women in Statistics, 2022. Retrieved from TÜİK Kurumsal (tuik.gov.tr) on 26 June 2024.

[148] Turkish Statistical Institute, Women in Statistics, 2022. Retrieved from TÜİK Kurumsal (tuik.gov.tr) on 26 June 2024.

[149] Members of the 28th Term Turkish Parliament. Retrieved from Türkiye Büyük Millet Meclisi (tbmm.gov.tr) on 26 June 2024.

[150] World Economic Forum, Global Gender Gap Report. June 2023. Retrieved from https://www3.weforum.org/docs/WEF_GGGR_2023.pdf on 26 June 2024.

[151] TSKB, Tepav and TOBB, Gender Equality Assessment in 81 Provinces, 2020. Retrieved from https://www.tskb.com.tr/uploads/file/8c1cb7177b044d3e4d0aaae6a7ed121c-1639646238384.pdf on 26 June 2024.

regarding the Project's local employment of both women and men were reported by the consulted local community members during the site visit in January 2024. According to the expert opinion of the ESIA Team, type of jobs that local women would be interested in may include but not limited to catering and cleaning activities within the scope of the Project, which may not require specific training other than the obligatory induction trainings which will be provided by the Project Company upon recruitment.

Apart from above-mentioned issues, women are considered to be the main beneficiaries within the scope of the potential corporate social responsibility activities of the Project Company.

13.3.7 Vulnerable Groups

EBRD Environmental and Social Policy (2019) and IFC's Sustainability Framework (2012) define vulnerable groups as the individuals and groups that may be directly and differentially or disproportionately affected by the project because of their disadvantaged or vulnerable characteristics such as their gender, sexual orientation, religion, ethnicity, indigenous status, age (including children, youth, and the elderly), physical or mental disability, literacy, political views, or social status.

For the identification and qualification of the vulnerable groups residing in the Project's social AoI, main issues and vulnerabilities in the Project affected villages reported by the consulted mukhtars as well as available data from the governmental institutions are taken into consideration together with the site visit observations.

The vulnerable groups relevant to the Project are identified as economically displaced people whose livelihoods are significantly and adversely affected due to land acquisition process of the Project, the disabled, the poor, the elderly, students, women, woman-headed households, the landless/homeless, Syrians under temporary protection (SuTP), refugees under international protection (UIP), and the unemployed.

The unemployment rate within the Project affected villages is reported as low by the mukhtars. Each household has some income ranging from the retirement pension to higher levels of income through various types of economic activities (including agriculture, animal husbandry and wage labour). For the unemployed population, the local employment opportunities are regarded as a positive outcome.

Unpaid domestic labour is not considered by the mukhtars when they mention the unemployment rates. Employment rate is evaluated as per the employment status of the head of households and majority of the men who are head of the households are employed in the Project affected villages. Moreover, the unemployment rate is evaluated on the basis of people who are actively looking for a job. Therefore, women's unpaid labour does not create a situation that contradicts the unemployment rate.

According to the statements of the mukhtars of the villages, there is no disabled population within the Project affected villages. Project affected villages involve some households receiving support from Social Assistance and Solidarity Foundation (SASF) in terms of food, electricity and fuel (coal) allowance. SASF provides these types of support to the households whose per capita income is less than one third of the net minimum wage and who are regarded as the poor. Accordingly, a total of five people, four in Yılanhüyük village and one in Çiçekyurt village, receive such support.

The percentage of the youth is quite high among the total population in the Project affected villages. This young population usually consists of people who have recently come of legal age. It was stated that one resident in the village of Reşadiye receives an elderly pension.

It was stated that there were four to five students attending boarding school in Çiçekyurt village. Most of the people who migrated from the village for job opportunities went permanently, not as seasonal workers. It was stated that most of the outgoing population is retired.

There is a balanced gender distribution within the populations of the Project affected villages. As reported by the mukhtars, mostly the older women live alone in the Project affected villages, but they receive retirement pension or old age pension, and their children, grandchildren, relatives, and neighbours provide support to them for accessing to health facilities and food shopping.

There is no SuTP population in the Project-affected villages. The data for district level is not available. However, it is assumed that the SuTP population is low in the districts since the SuTP population in Sivas province is only 0.48% of the whole population[152]. There is also no official data available at village, district, or provincial level about the refugees UIP. The muhtars of Yılanhüyük and Reşadiye villages stated that a small number of Afghan shepherds come to work daily for animal husbandry activities.

13.4 Impact Assessment

This section presents the potential risks that may occur throughout the construction and operation phases of the Project. Further discussion of the ways in which these potential risks will be mitigated is provided in Section 13.5.

13.4.1 Construction

13.4.1.1 Population Influx

Considering the population structure of the settlements in the AoI, it is seen that the annual population growth rate has a low value (0.61% in Gürün) as given in Section 13.3.1. During the construction phase of the Project, there will be a need for semi-skilled and skilled workers. According to the Project Company's stakeholder engagement strategy, the Project Company tends to employ its workers from the affected villages. During the construction of the turbines, it is likely that semi-skilled workers who have undergone the necessary training will be employed from nearby districts, with access to this potentially mentioned source of employment, reverse migration is not thought to impact the population at this point.

Although it is important to utilize the workers needed for a short time during the construction phase, it cannot be said that it will provide a large influx of workers and a stable employment area that will change the course of the population over the years. If the needed skilled and semi-skilled workers cannot be corresponded from the villages, it is critical that new workers coming to the region from outside are oriented in accordance with the social codes of the villages and integrated into daily life. In this regard, influx impacts associated with non-local workers' use of local infrastructure (i.e., shops, mosques) are not estimated to occur in the scope of the Project.

As stated in the National EIA Report of the Project, around 50 workers are expected to be employed within the scope of the Project's construction phase whereas it is estimated to be 20 personnel during the operation phase. During the fieldwork, villagers were interviewed and it was understood that they did not have any problems with the workers of the Project. In this regard, the Project will not lead to a population influx and the magnitude of the impact as well as the sensitivity of the social receptors regarding this impact are considered to be negligible, which leads to an overall negligible significance within the impact assessment.

[152] Turkish Presidency of Migration Management, 2023. Retrieved from https://www.goc.gov.tr/gecici-koruma5638 on 26 June 2024.

13.4.1.2 Education

No impacts are anticipated on the access to education due to the Project's construction activities. The Traffic Management Plan will take into account the route and time of the students to school regarding transportation to education. The daily routes followed by a small number of children in the region for educational purposes are discussed further in *Chapter 15 Community Health & Safety*.

In this regard, the magnitude of the impact as well as the sensitivity of the social receptors regarding this impact are considered to be negligible, which leads to an overall negligible significance within the impact assessment.

13.4.1.3 Land Use, Physical and Economic Displacement

As per the documents shared by the Project Company, it is anticipated that the land acquisition activities will not cause any physical displacement. However, economic displacement will occur due to acquisition in public pasture lands, lease agreements and urgent expropriation process for eight private parcels. The analysis reveals several key points regarding the impacts:

- The Project will not involve the physical relocation of any individuals or households. There will be no need for residents to move from their homes, thereby avoiding the complex challenges and disruptions associated with physical displacement. The main impact will be the restriction of access to certain pasture areas that fall within the Project boundaries.
- The use of a total of 42 public parcels causes restrictions on economic activities and grazing animals. The mukhtar and residents of Maksutlu village stated that the animal population in the village is high and the pasture area is not sufficient. For this reason, overflow to the pasture areas of neighbouring villages has occurred. This situation causes minor disputes between people in different villages. In addition, the lack of pasturage activities close to the Project area has restricted access to the wetlands needed for animals to drink water. This has a direct negative impact on pastoral activities and herders' routes. However, after the end of the construction phase of the Project, the area except for nine acres of the 42 public parcels for which permission has been obtained will be available for use by local residents to carry out animal grazing activities. 0.9 hectare will be used as a platform area for the turbine areas after the end of construction. Project-induced economic displacement can be prevented or managed through various measures and proactive actions. This is primarily due to the presence of numerous alternative pasture areas available on public lands, which can accommodate the grazing needs of the local communities and livestock owners.
- As a result of the design revision of the Project (reduction from 20 to 14 turbines), operations will be carried out in less area and the economic displacement effect will be reduced.
- There are a total of 13 different affected shareholders in eight different private parcels where the expropriation process started. The relevant parcels are cultivated agricultural land. These parcels were leased before the expropriation process and the crops were paid for. The expropriation process of the eight parcels used for road construction and regular meetings with the owners are ongoing. There is no physical displacement in utilized private parcels.
- It has been observed that the construction works of the Project cause dust and have a negative impact on agricultural lands in the region. For this, road irrigation works and speed control of trucks are recommended.
- Local communities and herders will be able to continue their livelihood activities with minimal disruption, as the alternative pasture areas will provide sufficient resources for their livestock.
- While the region does not have extensive agricultural land, the construction activities of the Project, particularly related to the access road and the ETL route alignment, may cause minor disruptions to local agricultural activities. These disruptions, although not directly

involving private parcels or agricultural lands, could arise due to secondary factors such as increased traffic and dust generation.

  - Construction activities might temporarily block or restrict access routes to agricultural fields, causing inconvenience to farmers and possibly delaying farming operations.
  - Residents of the villages are not expected to be exposed to adverse impact regarding dust as detailed in *Chapter 7: Air Quality* in general. Even if the construction takes place between certain hours of the day, the activities, particularly those involving earthmoving (access road construction and widening the current roads) and the transportation of materials, can generate significant amounts of dust. This dust can settle on crops, potentially affecting their growth and yield.

- Additionally, beekeeping activities are carried out on a small scale in Çiçekyurt, Reşadiye (mobile) and Kürkçü (mobile) villages, but no negative impact is expected due to the Project area located on the hills. Nevertheless, local community members engaged in beekeeping should be taken into consideration for any existing plan amendments and land use design differentiation.
- It is stated in National EIA that the Project does not have any negative impact on forestry activities.

In addition, relevant parcels, ownership information, land use intentions, etc. will be assessed in the Final ESIA and appropriate mitigation measures for ETL construction will be presented.

All actions within the Project area will be conducted in compliance with the relevant national laws, including Law No. 5403 on "Soil Conservation and Land Use," Law No. 3083 on "Land Reform Regarding Rearrangement of Land in Irrigated Areas," Law No. 4342 on "Pasture Law," and Law No. 1380 on "Fishery Law," after obtaining the necessary permits.

Impacts in the villages of İncesu, Kaşköy and Kızılpınar, which are considered as secondary prioritization of impact assessment and are included in the ESIA due to their proximity to the access road to the site, will be assessed primarily in terms of community health and safety risks. Negative impacts such as traffic, dust, noise may affect the residents of the villages. The potential risks and mitigation measures presented in *Chapter 7: Air Quality*, C*hapter 9: Noise and Vibration* and *Chapter 15: Community Health and Safety* address these local community members as receptors that may be affected adversely.

Considering the minor economic displacement risks, the sensitivity of the local community members impacts from the Project’s land acquisition works is medium and the magnitude of the land acquisition impacts is moderate. Overall, the impact is assessed to be moderate adverse significance.

13.4.1.4 Local Economy, Livelihood Sources and Employment

Within the scope of the Project, no transaction will be carried out on any private parcel in the Project affected villages. Therefore, the main impact of land acquisition will only occur through the limitation of pasture areas, which are public land. There will be no physical displacement. Economic displacement is very minor due to the high number of alternatives to pasture areas in public lands. The Project’s impacts on livelihood are further assessed in the Section 13.4.1.3.

In addition, it is observed that agricultural areas are quite limited in the Project affected villages. Completely dry agricultural lands such as barley, wheat, chickpea is observed around the Project licence area. It has been assessed that the land on which the turbines and switchyard will be located within the scope of the Project is considered to be unsuitable for agriculture, eroded and highly sloping. However, critical periods for cultivating activities in the Project’s social AoI still should be consulted with the PAPs and considered during the construction activities in order to reduce the risk of dust and loss of livelihood. A CDP specific to the Project affected villages will be prepared during finalisation of the ESIA study.

There is a family who carries out organic honey production with 100 hives in Çiçekyurt village. For other villages, local community members stated that mobile beekeepers regularly using the region to locate their beehives. The beekeeping activities do not intersect within the Project AoI.

One of the possible positive impacts of the Project is local employment creation during the construction phase. In general, it is observed that the youth population is quite high in the Project affected villages. As reported by the Project Company representatives, the contractors and subcontractors will employ the local unskilled and semi-skilled workforce. This can contribute to a more positive approach towards the Project by the local communities, a certain reduction in unemployment, and increase in the welfare of the employed workers' families.

The magnitude of these positive and negative impacts is negligible and the sensitivity of the receptors in regard to this impact is negligible which eventually corresponds to a negligible impact significance.

13.4.1.5 Infrastructure: Health, Transport, Water Supply and Sewerage

Majority of the Project affected settlements do not have a health centre within the settlement. Therefore, residents have to go to district centres to access the health care facilities. Construction activities and increased traffic may cause local community members' transportation time to these centres to increase. This may also affect residents' access to local community infrastructures such as schools and mosques. However, there are no schools in the villages within the social AoI except for the Koyunlu village. Still, increased traffic volume during the construction phase throughout the access roads to the Project area may result in road traffic safety risks. Yet, during the operation and construction periods of the existing plan, no significant impact on safety of passengers and drivers was observed. For detailed information, please see Section 15.4.1.4 for impact assessment on traffic safety.

All villages have electricity network and landline telephone. During the construction phase, power outages associated with construction activities may cause disruptions in the daily life of the local communities.

There is usually a water supply network or a spring water in the villages. In some of the villages, mukhtars and the residents stated that they have difficulties in accessing water due to various reasons such as old pipes and cold weather. Construction activities may cause disruption in the daily lives of the local community members by causing temporary water shortages or contamination of natural spring water. Please see *Chapter 5: Water Quality, Hydrology and Hydrogeology* for detailed information.

There is no agricultural infrastructure in the Licence Area. For the agricultural areas within the License area, approval for non-agricultural use will be acquired in accordance with Article 13 of the Soil Conservation and Land Use Law No. 5403. According to the approval granted by the Ministry of Agriculture and Forestry, there shall be no agricultural infrastructure on these roads that would prevent land use. However, it should be noted that there is a potential for agricultural infrastructure in the Project affected villages to be adversely affected within the scope of construction activities (i.e., road density) of the Project.

Damage to the irrigation systems in the expropriated area may have an impact on irrigation for the remaining land. To address this, the deteriorated irrigation systems will be repaired, and necessary precautions will be taken to prevent subcontractors from causing further damage. Additionally, efforts will be made to ensure local communities have access to their agricultural lands, forests, and grazing areas based on their requests. Technical solutions will be explored to maintain access to forests and farmlands, establishing or restoring routes. Strategies will also be developed to guarantee access to grazing lands, with appropriate pathways reinstated for both local community members and animals.

Should mitigation measures not be followed and implemented in accordance with the scope of construction activities, the impact is assessed as moderate as this will affect the daily lives and agricultural activities of the local residents.

In terms of impact assessment on waste management infrastructure, please see *Chapter 11: Waste and Resources.*

In most of the village, it was stated by the mukhtars and the residents that the roads providing access to the villages and between villages are inadequate and of poor quality. PAPs stated that the existing roads create various problems for vehicles, and that the roads to be built will facilitate the transportation of the residents of the Project affected villages. Overall, the roads planned to be constructed and improved will strengthen the logistics infrastructure of the region in general, in addition to agricultural transport.

The operation of infrastructure facilities is of great importance for the people living in that region to continue their daily lives. Consideration should be given to ensuring that the infrastructure system is operational throughout the construction period.

The Project's infrastructure-related impacts have minor magnitude during the construction phase of the Project. The sensitivity of social receptors is medium, which corresponds to the minor significance level.

13.4.1.6 Gender Considerations

The Project is not expected to cause any negative impact on gender considerations during the construction phase. Rather, the Project may contribute to the gender equality through local employment of both women and men residing in the Project affected villages.

It should be also taken into account that the land acquisition activities are conducted with the equity and equality perspective, in which all affected people are approached without any discrimination due to their gender and other characteristics.

The potential influx of male workers into villages due to the Project construction activities has various impacts on women's daily lives and livelihood activities, which should be considered when discussing gender and vulnerable groups. National EIA Report of the Project states that the needs of the Project workforce during both construction and operation phases will be provided through the administrative building on the Project area. In this regard, there will not be a campsite for workers' accommodation. Hence, increased congestion and noise are not expected to disrupt women's daily routines, including household chores, childcare responsibilities, and access to community resources. The fact that the construction sites are close to the residential areas of the village and that some of the construction activities within the scope of the Project are carried out on agricultural lands where women also work poses potential risks. However, as only a limited number of women stakeholders in the Project affected villages could be interviewed due to the lack of participation, the conclusion that as there was a low risk of potential harassment does not necessarily mean that the risk is actually low.

Furthermore, economic impacts are not expected to manifest as competition for local employment opportunities, which could be intensified in a way that potentially limits women's access to jobs or income-generating activities. In general, none of the mentioned socio-economic impacts are expected to be realised in this Project due to the limited interaction areas of workers and women.

Within the scope of the gender considerations, gender-based violence and harassment (GBVH) risks take a significant place. Throughout the construction activities, it is necessary to take measures against the GBVH risks. Accordingly, security measures should be taken within the construction sites through the security personnel and the establishment of a surveillance

system. The construction phase Project workers should receive trainings on prevention of GBVH risks.

In addition, the grievance mechanism of the Project that ensures safety and confidentiality should be established. Both the security measures and the grievance log will be monitored regularly, and improvements will be adapted when necessary. Since the Project Company plans to employ local community members to the possible extent and the impacts of labour influx is low, the Project's gender-related impacts including GBVH have minor magnitude during the construction phase of the Project. The sensitivity of social receptors is negligible, which corresponds to the negligible significance level.

13.4.1.7 Vulnerable Groups

Although there is no major impact on vulnerable groups, all construction activities will be carried out considering the vulnerabilities of existing groups (i.e., the elderly local community members, local community members with chronic health problems like hernia and asthma).

The groups specified in the Section 13.3.7 are considered to be vulnerable because their daily life practices and/or access to certain services (i.e., health facilities in the district) might be affected disproportionately and negatively due to Project impacts.

Throughout the construction activities, it is necessary to take measures to prevent vulnerable groups from being exploited in any sense. In general, the impacts on students are assessed with a particular focus on traffic management, while no negative impacts are expected for non-school-age children. However, increased traffic volume during the construction phase throughout the access roads to the Project area may result in road traffic safety risks. Yet, during the operation and construction periods of the existing plan, increased traffic volume is not expected to have a significant impact on the social AoI of the Project. Please see Section 15.4.1 for impact assessment on traffic safety.

The vulnerable groups should be visited with special attention and their problems should be solved quickly. In addition, the grievance mechanism of the Project that ensures safety and confidentiality should be established.

The Project's vulnerable group related impacts have minor magnitude during the construction phase of the Project. The sensitivity of social receptors is low, which corresponds to the negligible significance level.

13.4.2 Operation

13.4.2.1 Population Influx

With the operation phase of the Project, it will not create a significant change in the local population. Since the operational control and safety of the turbines will continue from the central system without the need for extra local employees, it is not anticipated to change the structure of the regional population or to create a pressure on the population. Therefore, there are no adverse impacts foreseen.

13.4.2.2 Education

There are no impacts anticipated during operation phase of the Project in terms of education.

13.4.2.3 Land Use, Physical and Economic Displacement

There are no impacts foreseen during operation phase of the Project regarding land use, physical and economic displacement.

13.4.2.4 Local Economy, Livelihood Sources and Employment

The Project is not estimated to employ high number of unskilled and/or semi-skilled workforce for the operation phase. On the other hand, as reported by the mukhtars of the Project affected settlements, general population is low in the villages and while the youth population is quite high in the villages, the majority of these young people are not yet of an age to enter the workforce. Therefore, there are no impacts anticipated during operation phase of the Project regarding employment opportunities.

On the other hand, there are pasture lands where the Project is located. Main concerns reported by the consulted local community members were about the loss of income for the households whose livelihood is based on animal husbandry. However, the turbine areas will not be fenced, which will enable the herds to be grazed.

The magnitude of these impacts about loss of livelihood is minor and the sensitivity of the receptors affected from these impacts is negligible. Overall, the significance of the impacts is assessed to be negligible.

13.4.2.5 Infrastructure: Health, Transport, Water Supply and Sewerage

There are no impacts anticipated during operation phase of the Project in terms of access to or quality of the infrastructural services.

13.4.2.6 Gender Considerations

There are no impacts foreseen during operation phase of the Project regarding gender considerations.

13.4.2.7 Vulnerable Groups

There are no impacts foreseen during operation phase of the Project regarding vulnerable groups.

13.4.3 Summary

Within the scope of ESIA studies, sensitivities of the receptors were identified according to the matrix described below.

Table 13.12: Social environment sensitivity/value criteria for resource/receptors

Subject	High	Medium	Low	Negligible
Population Influx	Dramatic change on the population and sociocultural conflicts due to labour influx	Manageable change on the population and sociocultural conflicts due to increased number of workers coming from outer regions	Small change on the population due to increased number of workers coming from outer regions	No change on the population other than the usual population growth
Land Use and Economic Displacement	Inaccessibility to lands, inability to use lands, physical and economic displacement with no other alternatives	Restrictions on use of and access to lands, physical and economic displacement with limited alternatives	Relatively and temporary negative impacts on the use of and access to lands	No obstacles regarding the use of and access to lands
Local Economy, Livelihood Sources and Employment	Major impacts on loss of livelihood sources with no other alternatives, high rates of unemployment	Temporary instability on local economic activities with limited livelihood alternatives	A few number of livelihood and economic opportunities within the scope of the Project	No impacts in terms of local economic activities, livelihood sources and employment

Subject	High	Medium	Low	Negligible
Infrastructural Services	Inaccessibility to infrastructural services	Restrictions and safety risks when accessing to infrastructural services	Difficulties when accessing to infrastructural services	No obstacles in terms of access to infrastructural services
Gender	GBVH risks, increased gender inequality, discrimination, unequal rights on speak, the lands and inheritance	Increased burden on house-related responsibilities (i.e., more need for cleaning the house due to dust), hesitancy to raise voice during stakeholder engagement activities	More exposure to noise and visual impacts due to house-related responsibilities	No impacts in terms of gender considerations
Vulnerable Groups	Major impacts leading the vulnerable groups to be open to underestimation, inconsideration, abuse, and discrimination	The possibility of existing vulnerabilities' increasing due to the Project activities	Temporarily (i.e., daily) and tolerable disturbances	No impacts on vulnerable groups

Table 13.13: Impact significance during construction

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Population Influx	Local community members / Project affected villages	Low	Construction	AoI	Reversible	Unlikely	Negligible	Negligible	Negligible
Education	Local community members / Project affected villages	Low	Construction	AoI	Reversible	Possible	Negligible	Negligible	Negligible
Land Use and Economic Displacement	Local community members who use public pasture lands	Medium	Pre-Construction / Construction	AoI	Irreversible unless compensated	Definite	Moderate	Medium	Moderate
Local Economy, Livelihood Sources and Employment	Local community members	Medium	Construction	AoI	Reversible	Possible	Negligible	Negligible	Negligible
Infrastructural Services	Local community members / Project affected villages	Medium	Construction	AoI	Irreversible under specific conditions	Possible	Minor	Medium	Minor
Gender	Local community members	Medium	Construction	AoI	Irreversible under specific conditions	Possible	Minor	Negligible	Negligible
Vulnerable Groups	Local community members who are in a more disadvantaged position	Medium	Construction	AoI	Irreversible under specific conditions	Possible	Minor	Negligible	Negligible

Table 13.14: Impact significance during operation

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Local Economy, Livelihood Sources and Employment	Local community members	Medium	Operation	AoI	Reversible	Possible	Minor	Negligible	Negligible

13.5 Impact Mitigation & Residual Impact

In order to mitigate the impacts that are identified for the construction and operation phases of the Project, certain measures are identified and listed below:

13.5.1 Construction

13.5.1.1 Population Influx

- The Project workers will receive regular trainings upon the recruitment and throughout the employment on the social sensitivities, prevention, and ways to report GBVH, measures to be taken to avoid social unrest and conflicts, and documents to be disclosed to and signed by the Project.
- Potential risks to local communities will be identified by the Project Company and a Code of Conduct (CoC) in local community relations will be prepared.
- Within the scope of the SEP and community grievance mechanism of the Project, grievances of residents regarding the construction, workers or any other issues will be monitored by the Community Liaison Officer (CLO). Similarly, the CLO will continue to organize regular consultation and stakeholder engagement activities as specified in the SEP.

13.5.1.2 Education

- Within the scope of the SEP, the CLO will continue to organize regular consultation and stakeholder engagement activities.
- Project's community grievance mechanism will be established which will provide easy access for teachers and students to raise their grievances.

13.5.1.3 Land Use, Physical and Economic Displacement

- Continuous consultation and engagement through an active stakeholder engagement and grievance mechanism
  - The Project-specific Stakeholder Engagement Plan and community grievance mechanism will be put in place to consult with the Project affected people and to be able to capture individual grievances related to the land acquisition processes.
  - With the community grievance mechanism any request, concern or complaint will be considered, recorded, and managed properly. In particular, the grievances of the Project affected people of the villages will be resolved with clear information.
- With the CDP to be prepared, the main problems related to livelihood in the region will be identified. Local community members in neighbouring villages where animal husbandry is the main source of livelihood will be interviewed; infrastructural or economic-based problems in the villages will be understood with the mukhtars; macro level information will be collected from local authorities and solution suggestions and key stakeholder information will be compiled. These CDP actions will be monitored during the construction and operation phase.
- Implementation of the measures to allow continued access to affected resources or to provide access to alternative resources with equivalent livelihood earning potential and accessibility.
  - The Project Company will implement mitigation measures to address any potential limitations on pasture access. This includes identifying and providing access to alternative pasture areas to ensure that the local herding practices can continue with minimal disruption.
- During interviews with landowners, the Project takes into account their requests to fully divest themselves of the land in order to mitigate potential livelihood challenges associated with land purchases.

- Develop and implement comprehensive a Traffic Management Plan to ensure the smooth flow of construction vehicles and minimize disruptions to local traffic. This includes scheduling construction vehicle movements during off-peak hours and using alternative routes where possible (For more details, please see *Chapter 15: Community, Health, and Safety*).
  - Ensure that construction materials transported to and from the site are covered to prevent dust emission during transit.
- Provide temporary access routes for local community members who engaged in agricultural activity to ensure continuous access to their fields during construction activities. This might involve constructing temporary bridges or bypasses around construction zones.
  - Work closely with local farmers to understand their schedules and critical periods for agricultural activities. Coordinate construction activities to avoid peak farming times and minimize disruptions.

13.5.1.4 Local Economy, Livelihood Sources and Employment

- The Project Company will develop a local employment and procurement strategy by defining the potential local economic and livelihood opportunities.
- With the CDP to be prepared, the main problems related to livelihood in the region will be identified. Local community members in neighbouring villages where animal husbandry is the main source of livelihood will be interviewed; infrastructural or economic-based problems in the villages will be understood with the mukhtars; macro level information will be collected from local authorities and solution suggestions and key stakeholder information will be compiled. These CDP actions will be monitored during the construction and operation phase.
- Gürün District Directorate of Agriculture will be consulted to identify the locations of the beehives during construction phase of the Project, ensuring they are safeguarded from any adverse impact. Should any harm come to the beehives, beekeepers' economic losses will be compensated.
- Through the regular consultation and stakeholder engagement activities as well as community grievance mechanism, residents living in the Project affected villages will have the chance to raise their requests regarding the employment and procurement opportunities as well as the potential negative impacts on the quality of the agricultural products due to dust generation as a result of the Project's construction activities.

13.5.1.5 Infrastructure: Health, Transport, Water Supply and Sewerage

- When infrastructural problems (i.e., for water, road, transportation issues) occur due to the construction phase of the Project, correspondences will be arranged with governmental institutions, if necessary, and further actions will be taken for resolution.
- Within the scope of the SEP and community grievance mechanism of the Project, grievances of residents regarding the infrastructural issues will be monitored by the CLO. Similarly, the CLO will continue to organize regular consultation and stakeholder engagement activities as specified in the SEP.

13.5.1.6 Gender Considerations

- Potential risks on the local community members on the basis of the gender considerations will be identified by the Project Company and relevant items will be included in both the Workers' CoC and Security Force CoC that will be prepared by taking into account the local community relations.
- Awareness raising activities about gender equality and prevention of GBVH will be organized within the Project affected villages to the extent possible.
- The CLO will receive training on gender equality and prevention of GBVH.

- The CLO will organize specific meetings with women in the Project affected villages.
- Relevant security measures (i.e., cameras, alarms) will be taken within and around the Project area. These measures will be included in the Community Health, Safety and Security Procedure.Within the scope of the SEP and community grievance mechanism of the Project, grievances of residents regarding the gender issues will be monitored by the CLO. Similarly, the CLO will continue to organize regular consultation and stakeholder engagement activities as specified in the SEP.

13.5.1.7 Vulnerable Groups

- Potential risks on the vulnerable groups on the basis of the gender considerations will be identified by the Project Company and relevant items will be included in both the Workers' CoC and Security Force CoC that will be prepared by taking into account the local community relations.
- Within the scope of SEP, there will be specific communication mechanisms with vulnerable groups (e.g., special focus group discussions, household visits).
- The CLO will monitor emerging vulnerabilities through frequent settlement visits and take necessary measures against potential GBVH issues.
- Relevant security measures (i.e., cameras, alarms) will be taken within and around the Project area. These measures will be included in the Community Health, Safety and Security Procedure.
- Within the scope of the SEP and community grievance mechanism of the Project, vulnerable groups' grievances will be monitored by the CLO with a high prioritization as defined in the SEP. Similarly, the CLO will continue to organize regular consultation and stakeholder engagement activities through the accessible channels for all vulnerable groups as specified in the SEP.

13.5.2 Operation

13.5.2.1 Local Economy, Livelihood Sources and Employment

Through the regular consultation and stakeholder engagement activities as well as community grievance mechanism, residents living in the Project affected villages will have the chance to raise their grievances related to livelihood activities and requests regarding the employment and procurement opportunities.

13.5.3 Summary

Table 13.15: Residual impact during construction

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Population	Local community members / Project affected villages	Negligible	Negligible
Education	Local community members / Project affected villages	Negligible	Negligible
Land Use and Economic Displacement	Local community members who use public pasture lands	Moderate	Negligible
Local Economy, Livelihood Sources and Employment	Local community members	Moderate	Negligible
Infrastructural Services	Local community members / Project affected villages	Minor	Negligible
Gender	Local community members	Negligible	Negligible

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Vulnerable Groups	Local community members who are in a more disadvantaged position	Negligible	Negligible

Table 13.16: Residual impact during operation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Local Economy, Livelihood Sources and Employment	Local community members	Negligible	Negligible

14 Labour and Working Conditions

14.1 Introduction

Potential impacts on labour and working conditions, including the occupational health and safety risks associated with the construction and operation workforce of the Project together with its subcontractors are covered in this Chapter of the Draft ESIA Report.

14.2 Methodology

14.2.1 Labour and Working Conditions Methodology

The methodology of the labour and working conditions impact assessment is based on the desktop studies (i.e., the review of Project Company's shared documentation and publicly available data, international standards, and best practices) and a site visit to the Project area, which was conducted by the Consultant in January 2024.

The impacts are assessed in line with the national labour legislation and international requirements that are relevant to the Project's labour activities. In the assessment process, the impacts that may occur during the Project lifecycle and their possible risks on the workforce are considered by using the assessment criteria of this ESIA study. The significance of the impacts as well as mitigation measures are assigned on the basis of the expert judgement of the ESIA Team.

14.2.2 Occupational Health and Safety Risk Assessment Methodology

Risk assessment is the indispensable first step in provision and establishment of safer workplaces by preventing occupational accidents and ill health at the design stage of a project, prior to start of planning of activities or during operations. A risk assessment is performed in order to;

- determine the hazards that exist in a workplace or that may come from outside,
- identify the factors that cause these hazards to turn into risks,
- analyse and ratify the risks arising from the hazards and
- define control measures to be taken.

This generic health and safety risk assessment methodology is based on the principles set by the Regulation on Occupational Health and Safety Risk Assessment (Regulation on OHSRA), ISO 45001:2018 Occupational Health and Safety, good industry practice examples and the professional judgment of the expert.

Regulation on OHSRA does not define a specific methodology for risk assessments, however, defines the members of a risk assessment team, the main sources of information to define the hazards exist at the workplace, identification, and analyses of risks due to the hazards, hierarchy of risk control measures, documentation requirements and renewal periods, in detail.

In this study, health and safety risks are determined by estimating the potential severity of harm and the likelihood of the harm that will occur for a given hazard. To estimate the severity of harm; How severe could the adverse consequence be, taking as reference the worst foreseeable (but plausible) scenario and considering the existing mitigation measures in place? Was considered. To estimate the likelihood of harm; How likely is it that the adverse consequence could occur, considering the existing mitigation measures in place? The scale for severity of harm and likelihood of harm are shown in Table 14.1 and Table 14.2, respectively.

Table 14.1: Harm Severity

Severity	Meaning	Value
Catastrophic	• Equipment destroyed • Multiple deaths	A
Hazardous	• A large reduction in safety margins, physical distress, or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely • Serious injury • Major equipment damage	B
Major	• A significant reduction in safety margins, reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency • Serious incident • Injury to persons	C
Minor	• Nuisance • Operating limitations • Use of emergency procedures • Minor incident	D
Negligible	• Few consequences	E

Table 14.2: Likelihood of Harm Category

Severity	Meaning	Value
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred infrequently)	4
Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

The magnitude of risk matrix based on the severity of harm and likelihood of harm is provided in Table 14.3, where a hazard's severity is multiplied by its probability. For this purpose, a magnitude of risk matrix of 5x5 was used.

Table 14.3: Risk Level Matrix

Risk Probability		Risk severity				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Probable	1	1A	1B	1C	1D	1E

In Table 14.4, a safety risk tolerability matrix is defined for risk level matrix.

Table 14.4: Safety Risk Tolerability Matrix

Risk Index Range	Description	Recommended Action
5A, 5B, 5C, 4A, 4B, 4C 3A	High risk	Cease or cut back operation promptly if necessary. Perform priority risk mitigation to ensure that additional or enhanced preventive controls are put in place to bring down the risk index to the moderate or low range.
5D, 5E, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	Moderate risk	Schedule performance of a safety assessment to bring down the risk index to the low range if viable.
3E, 2D,2E, 1B, 1C, 1D, 1E	Low risk	Acceptable as is. No further risk mitigation required.

14.2.3 Applicable Guidelines and Standards

14.2.3.1 National Requirements

The Labour Law No. 4857, Occupational Health and Safety Law No. 6331, and associated laws and regulations are applied in Türkiye for labour management and occupational health and safety issues. These laws and regulations aim at defining the duties, responsibilities, terms and conditions of employment, work-related rights, labour and working practices, and obligations of both the employer and the employees. By this way, proper labour management systems and occupational health and safety measures at work are provided and/or current working conditions as well as health and safety practices are improved. A comprehensive list of national laws and regulations regarding labour and working conditions is provided below.

Table 14.5: National laws and international conventions regarding labour and working conditions and occupational health and safety

Law/Regulation	Official Gazette (OG) date	OG number
Labour Law (4857)	10.06.2003	25134
Occupational Health and Safety Law (6331)	30.06.2012	28339
Regulation on Workplace Opening and Permit	10.08.2005	25902
Law on Public Tenders (4734)	22.01.2002	24648
Regulation on Contractors and Subcontractors	27.09.2008	27010
Law on Trade Union and Collective Bargaining (6356)	07.11.2012	28460
Law on Unions and Collective Bargaining for Public Servants (4688)	12.07.2001	24460
First Aid Regulation	29.07.2015	29429
Law on Social Insurance and General Health Insurance (5510)	16.06.2006	26200
Regulation on Working Duration Related to Labour Law	06.04.2004	25425
Regulation on Excess Work and Work in Excess Periods related to Labour Law	06.04.2004	25425
Regulation on Special Principles in Works Carried out by Employing Workers in Shifts	07.04.2004	25426
Regulation on Minimum Wage	01.08.2004	25540
Regulation on Working Procedures and Principles of Child and Young Workers	06.04.2004	25425

Law/Regulation	Official Gazette (OG) date	OG number
Regulation on Suspension of Work in Workplaces	30.03.2013	28603
Regulation on Annual Paid Leave	03.03.2004	25391
Regulation on Overwork and Overtime	06.04.2004	25425
Law on People with Disabilities (5378)	07.07.2005	25868
Regulation on Occupational Health and Safety Services	29.12.2012	28512
Regulation on Occupational Health and Safety in Construction Works	05.10.2013	28786
Regulation on the Procedures and Principles of the Employee's Health and Safety Trainings	15.05.2013	28648
Regulation on Occupational Health and Safety Committees	18.01.2013	28532
Regulation on Occupational Health and Safety Risk Assessment	29.12.2012	28512
Regulation on Duties, Authority, Responsibilities and Trainings of Occupational Health and Safety Specialists	29.12.2012	28512
Regulation on the Health and Safety Measures to be taken in Workplace Buildings and Additions	17.07.2013	28710
Regulation on Duties, Authority, Responsibilities and Trainings of On-site Doctor and Other Health Personnel	20.07.2013	28713
Regulation on Accessibility Monitoring and Auditing	20.07.2013	28713
Regulation on Occupational Health and Safety in Temporary or Fixed Term Employment	23.08.2013	28744
Regulation on Manual Handling	24.07.2013	28717
Regulation on Road Traffic	18.07.1997	23053
Regulation on Safety and Health Signs	11.09.2013	28762
Regulation on the Works in Which Workers shall Work Maximum Seven and Half Hours or Less in a Day in Terms of Health Rules	16.07.2013	28709
Regulation on Use of Personal Protective Equipment in Workplaces	02.07.2013	28695
Regulation on the Emergency Situations in Workplaces	18.06.2013	28681
Regulation on the Protection of Workers from the Dangers of the Explosive Media	30.04.2013	28633
Regulation on the Control of Dust Emissions	05.11.2013	28812
Exhaust Gas Emission Control Regulation	11.03.2017	30004
Regulation on the Protection of the Workers against Vibration Risks	22.08.2013	28743
Regulation on the Protection of the Workers against Risks Relevant to Noise	28.07.2013	28721
Regulation on Environmental Noise Emission Generated by the Outdoor Equipment Used at Site	30.12.2006	26392
Regulation on Protection of Buildings from Fire	20.11.2021	31665
Türkiye Earthquake Regulation for Buildings	18.03.2018	30364

Source: T.R. Presidential Complex General Directorate of Law and Legislation[153]

14.2.3.2 International Requirements

The following international requirements have been taken into account to assess labour and working conditions during the ESIA process:

- IFC's Performance Standards on Environmental and Social Sustainability (2012)
  - Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts: PS 1 emphasizes on the importance of: (i) an integrated assessment

[153] Retrieved from: https://www.mevzuat.gov.tr/ on 02 April 2024.

to identify the environmental and social impacts, risks and opportunities of the Project; (ii) effective community and stakeholder engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the Client's management of social and environmental performance throughout the life of the Project through management programs, monitoring, and review.

  - Performance Standard 2 – Labour and Working Conditions: PS 2 recognises that a balance between economic growth and workers' fundamental rights is needed. The objectives are: (i) to promote a non-discriminative, equal working environment for workers; (ii) to maintain and improve the worker-management relationship; (iii) to ensure compliance with national labour and employment laws; (iv) to protect vulnerable workers; to promote a safe and healthy working environment and the health of workers; lastly, (v) to protect the workforce by addressing child labour and forced labour.
- EBRD's Environmental and Social Policy & Performance Requirements (2019)
  - Performance Requirement 1 – Assessment and Management of Environmental and Social Risks and Impacts: PR 1 emphasizes on the significance of integrated assessment to identify the environmental and social impacts and issues associated with the Project and the Client's management of environmental and social performance throughout the life cycle of the Project.
  - Performance Requirement 2 – Labour and Working Conditions: PR 2 recognises that workforce is a valuable asset for the Client and its business activities, and that effective human resources management and a reliable worker-management relationship based on respect for workers' rights, including freedom of association and right to collective bargaining, are key pillars for ensuring the sustainability of business activities.
  - Performance Requirement 4 – Health, Safety and Security: PR 4 recognises the significance of managing health, safety, and security risks (including project-related gender-based violence risks of sexual harassment, sexual exploitation, and abuse) to workers, project-affected communities and consumers associated with Project activities, by performing a risk control hierarchy.
- Equator Principles IV (2020)
  - Principle 2 – Environmental and Social Assessment: Principle 2 requires performing a process to address the relevant environmental and social risks and scale of impacts of the Project. The assessment is expected to propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to workers, affected communities, and the environment. Principle 2 also expects that assessments of potential adverse human rights impacts and climate change risks are included as part of the ESIA.

In addition to above-mentioned standards, labour and working conditions impact assessment has been conducted in line with the following standards and guidelines:

- IFC/EBRD's Guidance Note on Workers Accommodation: Processes and Standards (2009)
- IFC's Environmental, Health and Safety (EHS) General Guidelines (2007)
- IFC's Environmental, Health and Safety (EHS) Guidelines for Electric Power Transmission and Distribution (2007)
- IFC's Environmental, Health and Safety (EHS) Guidelines for Wind Energy (2015)
- WBG Environmental, Health and Safety (EHS) Guidelines
- Applicable International Labour Organisation (ILO) Conventions
- Applicable Environmental, Social, Occupational Health and Safety Directives of the European Union (EU)
- European Commission's Guidance Document on Wind Energy Developments and EU Nature Legislation (2020)

The International Labour Organisation (ILO) of the United Nations is responsible for overseeing the compliance of labour and working conditions with international labour standards. ILO conventions reflect common values and principles on work-related issues and Member States can choose whether to ratify them. The ILO regularly monitors the implementation and the application of the conventions as well as developments in countries generally, whether they have chosen to ratify ILO conventions. The list given below presents the International Labour Organization (ILO) Conventions on labour and working conditions that are ratified by Türkiye.

Table 14.6: ILO Conventions on labour and working conditions ratified by Türkiye

Name	Date	Convention No
Unemployment Convention	1919	C-2
Right of Association (Agriculture) Convention	1921	C-11
Weekly Rest (Industry) Convention	1921	C-14
Minimum Age (Trimmers and Stokers) Convention	1921	C-15
Minimum Wage-Fixing Machinery Convention	1928	C-26
Forced Labour Convention	1930	C-29
Fee-Charging Employment Agencies Convention	1933	C-34
Workmen's Compensation (Occupational Diseases) Convention (Revised)	1934	C-42
Underground Work (Women) Convention	1935	C-45
Officers' Competency Certificates Convention	1936	C-53
Shipowners' Liability (Sick and Injured Seamen) Convention	1936	C-55
Minimum Age (Sea) Convention (Revised)	1936	C-58
Minimum Age (Industry) Convention (Revised)	1937	C-59
Food and Catering (Ships' Crews) Convention	1946	C-68
Certification of Ships' Cooks Convention	1946	C-69
Medical Examination (Seafarers Convention	1946	C-73
Medical Examination of Young Persons (Industry) Convention	1946	C-77
Final Articles Revision Convention	1946	C-80
Labour Inspection Convention	1947	C-81
Freedom of Association and Protection of the Right to Organise Convention	1948	C-87
Employment Service Convention	1948	C-88
Accommodation of Crews Convention (Revised)	1949	C-92
Labour Clauses (Public Contracts) Convention	1949	C-94
Protection of Wages Convention	1949	C-95
Fee-Charging Employment Agencies Convention (Revised)	1949	C-96
Right to Organise and Collective Bargaining Convention	1949	C-98
Minimum Wage Fixing Machinery (Agriculture) Convention	1951	C-99
Equal Remuneration Convention	1951	C-100
Social Security (Minimum Standards) Convention	1952	C-102
Abolition of Forced Labour Convention	1957	C-105
Seafarers' Identity Documents Convention	1958	C-108
Discrimination (Employment and Occupation) Convention	1958	C-111
Radiation Protection Convention	1960	C-115
Final Articles Revision Convention	1961	C-116
Equality of Treatment (Social Security Convention	1962	C-118
Guarding of Machinery Convention	1963	C-119
Employment Policy Convention	1964	C-122
Minimum Age (Underground Work) Convention	1965	C-123
Maximum Weight Convention	1967	C-127

Name	Date	Convention No
Accommodation of Crews (Supplementary Provisions) Convention	1970	C-133
Prevention of Accidents (Seafarers) Convention	1970	C-134
Workers' Representatives Convention	1971	C-135
Minimum Age Convention	1973	C-138
Human Resources Development Convention	1975	C-142
Tripartite Consultation (International Labour Standards) Convention	1976	C-144
Seafarers' Annual Leave with Pay Convention	1976	C-146
Labour Relations (Public Service) Convention	1978	C-151
Occupational Safety and Health (Dock Work) Convention	1979	C-152
Hours of Work and Rest Periods (Road Transport) Convention	1979	C-153
Occupational Safety and Health Convention	1981	C-155
Termination of Employment Convention	1982	C-158
Vocational Rehabilitation and Employment (Disabled Persons) Convention	1983	C-159
Occupational Health Services Convention	1985	C-161
Health Protection and Medical Care (Seafarers) Convention	1987	C-164
Repatriation of Seafarers Convention (Revised)	1987	C-166
Safety and Health in Construction Convention	1988	C-167
Safety and Health in Mines Convention	1995	C-176
Worst Forms of Child Labour Convention	1999	C-182
Promotional Framework for Occupational Safety and Health Convention	2006	C-187

Source: International Labour Organization (ILO) Conventions[154]

Out of these 59 Conventions ratified by Türkiye, 55 are in force, three have been denounced and one has been abrogated. Table given below presents the applicable International Labour Organization (ILO) Conventions on labour and working conditions.

Table 14.7: Applicable ILO Conventions on labour and working conditions

Name	Date	Convention No
Unemployment Convention	1919	C-2
Weekly Rest (Industry) Convention	1921	C-14
Forced Labour Convention	1930	C-29
Minimum Age (Industry Convention)	1937	C-59
Freedom of Association and Protection of the Right to Organise Convention	1948	C-87
Protection of Wages Convention	1949	C-95
Right to Organize Collective Bargaining Convention	1949	C-98
Equal Remuneration Convention	1951	C-100
Abolition of Forced Labour Convention	1957	C-105
Workers' Representative Convention	1971	C-135
Minimum Age Convention	1973	C-138
Occupational Safety and Health Convention	1981	C-155
Termination of Employment Convention	1982	C-158
Worst Forms of Child Labour Convention	1999	C-182

Source: International Labour Organization (ILO) Conventions Project Standards

[154] Retrieved from: Conventions ratified by Türkiye (ILO-Ankara) on 02 April 2024.

The Project Company has a number of corporate policies, which can provide baseline information for the development of labour-related management plans and procedures. Applicable corporate policies and management plans[155] of the Project Company are listed and summarized below:

- **Human Resources Policy:** With this Policy, the Project Company commits to comply with the requirements of the national Labour Law No. 4857 and respective regulations, fundamental principles of the ILO Conventions ratified by Türkiye on labour and working conditions to ensure effective and fair management of the workforce. The Policy includes certain statements related to the following:
  - Occupational Health and Safety (OHS) excellence,
  - "Zero Accidents" target by proving employees a healthy and safe working environment in line with applicable good industry practices,
  - The principles of non-discrimination and equal opportunity for all Project-related employment relationships,
  - Prevention of child labour and employment of only people fulfilling the national minimum age requirements for all Project Company employees (including contractors, subcontractors, and suppliers),
  - Prevention of any form of forced labour and ensuring that all Project Company employees (including contractors, subcontractors, and suppliers) enter into and leave employment voluntarily and freely in line with the applicable provisions of the national Labour Law and respective regulations,
  - Ensuring that HR management systems respect the cultural and gender sensitivities and the rights of workers to privacy and data protection,
  - Establishing and maintaining an internal grievance mechanism that is available to and known by all employees including contractor and subcontractor workers and allows them to raise project-related concerns, recommendations, and grievances without fear of intimidation, discrimination, or retaliation, and
  - Ensuring that appropriate procedures are put in place to ensure that the HR Policy and the internal grievance mechanism are effectively implemented by the Project Company for all its employees.
- **Labour Management Plan:** The purpose of this Plan is to present the minimum requirements of the employment process and to set out minimum requirements implemented to protect the fundamental rights of workers. The contractors are responsible for developing the environmental, social, and occupational health and safety management system to implement the requirements of this plan. The contractor is responsible for ensuring that all subcontractors have procedures or method statements in line with this plan, and if not, they must commit to work in accordance with the principles of the ESMS established by the Project Company.
- **Contractor Management Plan:** The purpose of this Plan is to determine the procedures during the selection, evaluation and management of the contractors, and monitoring, inspection and training actions related to these processes for the projects within the portfolio of the Project Company.
- **Supply Chain Management Plan:** The purpose of this Plan is to define the measures for management of the risks associated with the supply chain of the Project Company's projects including child and forced labour, inequality, significant safety issues and the degradation or

[155] The specified management plans are part of the ESMS of the Project Company and has been developed in accordance with the policies of the Project Company, Turkish regulatory framework, Equator Principles, EBRD Performance Requirements, IFC Performance Standards, AIIB Standards, and other applicable guidelines. These plans include guidelines and minimum requirements for contractors/subcontractors for developing their own relevant management plans appropriate to the nature and scale of the projects that they are involved in.

conversion of natural or critical habitats, and to increase the projects' local content by maximizing the local procurement for businesses and the local employment for unskilled and semi-skilled workforce and make sure that there is non-discriminatory, transparent, open to all and fair recruitment process.

- **OHS Management Plan:** The purpose of this Plan is to provide safe environment for employees, visitors, and humans around, to indicate precaution hierarchy during the project activities by determining health, safety risks, which occur/may occur as a result of activities, and to ensure top level occupational health and safety studies and inspections at all construction and operational activities in the projects of the Project Company.
- **Emergency Response Plan (ERP):** The purpose of this Plan is to create a guide document for the project-specific ERPs to be prepared. The main purpose of the project-specific ERPs will be to define and implement the actions, evacuation procedures and response systems that should be implemented by all project employees and stakeholders in any emergency.
- **Labour and OHS Audit System Plan:** The purpose of this Plan is to provide a framework and guideline for monitoring and audit of the Project Company activities and set for the principles and procedures related to labour and OHS audit to ensure compliance with the ESMS requirements of the Project Company.
- **Supplier and Contractor Audit System Plan:** The purpose of this Plan is to provide a framework and guideline for monitoring and audit of the Project Company's suppliers and contractors and set for the principles and procedures related to supplier and contractor audit to ensure compliance with the ESMS requirements of the Project Company.
- **Procurement Policy:** With this Policy, the Project Company commits to manage and control the procurement processes according to international standards and work with suppliers of the same quality and standards. The Policy aims to ensure that the Project Company's suppliers understand the Borusan Group's business principles, business ethics rules and comply in accordance with all these principles and rules when fulfilling the required obligations. It also emphasizes treating fairly, respectfully, and equally without any discrimination to the suppliers that the Project Company works with.
- **Equal Opportunities Plan:** The purpose of this Plan is to present the minimum requirements to ensure that discrimination and harassment at the workplace is avoided, and that all Project Company employees have equal opportunity without considering their gender, race, nationality, and religion in all areas of the projects within the portfolio of the Project Company.

In addition to these plans and policies, the Project Company has established separate codes of conduct for its employees and security personnel that identify the behaviour and the responsibilities with clear statements.

The Project Company has also an integrated Quality, Health and Safety, Environment and Energy Management Systems and relevant certifications, which are listed below:

- ISO 9001: 2015 - Quality Management System
- ISO 14001: 2015 - Environmental Management System
- ISO 45001: 2018 - Occupational Health and Safety Management
- ISO 50001: 2018 - Energy Management System
- ISO/IEC 27001: 2013 - Information Security Management System
- ISO 55001 – Asset Management System
- ISO 10002:2018 - Customer Satisfaction
- ICS 27.10 - Wind Turbine Energy Systems Standard Family

14.2.4 Limitations and Assumptions

The information on the Project's workforce to be employed as well as plans and procedures to be applied during both construction and operation phases is limited at the time of writing this Report. Therefore, labour and working conditions impact assessment remained general in terms of risks, opportunities, and mitigation measures based on the national legislation and international requirements and standards. The impact assessment on labour and working conditions has been conducted by considering the whole Project workforce including subcontractors and supply chain workers where relevant.

14.3 Baseline Description

14.3.1 Project Employment and Labour Relations

At national context, the wind energy industry provides employment opportunities for approximately 18,000 qualified personnel[156]. The industry creates employment in many business lines such as wind turbine tower manufacturing, spare parts manufacturing, transportation systems, transmission line manufacturing and assembly industry, maintenance and repair services, engineering and consultancy sector, financing, and software.

The construction phase is planned to be completed in 13 months, by working for 24 days in each month and 10 hours and one shift per day. During the construction phase, around 50 workers are expected to be employed within the scope of the Project whereas it is estimated to be 20 personnel during the operation phase. The current number of employees, subcontracting companies and positions can be roughly summarised as follows:

- The Project Company employees – five personnel
- Securitas/Security – two personnel
- Euroserv/Driver and facility cleaner – two personnel
- Eskikale/Construction company – 45 personnel
- Insuti/Drilling activities – 14 personnel
- Biodiversity Expert – one personnel

Another company for electricity operations is expected to be on site in the future.

14.3.1.1 Human Resources (HR) Management

On the basis of the organizational structure shared by the Project Company, it is understood that the labour and HR management of all Project workforce including contractors will be performed by the Human Resources Management Department[157].

As per the international requirements, an HR Policy describing the way the Project Company will manage its Project workforce (including contractors and subcontractors) needs to be developed. HR policy allows the Project Company to communicate with the workforce, adopt a consistent approach to managing them and demonstrate compliance with international standards and national laws. The HR Policy needs to be understandable with clear statements, accessible to all workers, and in the main language spoken by the workforce.

The Project Company has an HR Policy at corporate level, which is supported by other corporate policies and management plans related to labour and working conditions. The Corporate HR Policy and Corporate Labour Management Plan as well as other relevant

[156] Retrieved from https://tureb.com.tr/lib/edergi/20/20.pdf on 10 June 2024.

[157] According to the information shared by the Project Company, Project Management Office and Operations Department also have responsibilities in terms of labour and HR management in addition to the Human Resources Management Department.

corporate policies and management plans related to labour and working conditions can be applied within the scope of the Project for all Project workers including subcontractors.

The Project Company is responsible for disclosing the corporate policies as well as the Project-specific documentation to all Project workers.

14.3.1.2 Terms and Conditions of Employment

According to the international standards, the Project workers will be provided with the reasonable and fair terms and conditions of employment that are clear and understandable. The documentation (namely the contract) on terms and conditions will set out their rights under national labour and employment law (which will include any applicable collective agreements) including their rights related to hours of work, wages, overtime, compensation, and benefits and it will be provided at the beginning of the working relationship and when any material changes to the terms or conditions of employment occur. The workers will sign their contracts that clearly describe terms of employment including the working rights.

There will be adequate periods for rest in a weekly manner for workers. Overtime working hours should not be exceeding 270 hours per year as stipulated in the Labour Law No. 4857. Further, the workers' consent should be received for overtime work in a written way upon the employment, as specified in the law. Overtime work, work on weekends and public holidays will be compensated in accordance with requirements of this law.

The Project Company, the main contractor of the Project and its subcontractors will prioritize local employment and employment from directly affected villages of the Project to the extent possible. Currently, there are people employed from Gürün district (for positions such as cleaning staff, security, driver, etc.).

14.3.1.3 Facilities

National EIA Report of the Project states that the needs of the Project workforce (i.e., restrooms, changing rooms) during both construction and operation phases will be provided through the administrative building on the Project area. In this regard, there will not be a campsite for workers' accommodation.

14.3.1.4 Workers' Organisations

Project workers are covered by the Law on Trade Union and Collective Bargaining No. 6356. In line with this law, Turkish Labour Law No. 4857 and the international standards, the Project will recognize workers' rights to form and join workers' organisations of their choosing and to bargain collectively without interference. The Project workers will be informed about their right to unionization.

14.3.1.5 Non-Discrimination and Equal Opportunity

The work-related opportunities offered by the Project for all its potential and existing workforce will be based on the principles of fair treatment, non-discrimination and equal opportunity as per the international standards, Turkish Labour Law No. 4857 and the Project Company's as well as the main contractor's corporate policies.

As stated earlier, Project Company has Equal Opportunities Plan at corporate level for the implementation of fair treatment, non-discrimination, and equal opportunity principles. Accordingly, personal characteristics (i.e., gender, race, nationality, ethnic origin, religion or belief, disability, age, or sexual orientation) of the workers that are unrelated to inherent job requirements will be disregarded to provide them a working environment with equal opportunity and no discrimination.

There will be no discrimination with respect to any aspects of the employment relationship, such as recruitment, compensation, working conditions and terms of employment, access to training, promotion, or termination of employment.

14.3.1.6 Gender Considerations

A number of ILO conventions, including the conventions on equal treatment of employees and gender equality, have been ratified by Türkiye. The Turkish Labour Law No. 4857 is in line with the international labour standards and conventions in most aspects such as child labour, forced labour, non-discrimination, and equal opportunity, and right to join workers' organisations. However, there are no laws to support the gender equality at work in the Turkish legislation other than the maternity leave.

Ensuring a balance among the number of man and woman workers is a key principle to provide gender equality in the workplace. In this respect, the Project will determine a quota for women employment. The conditions of employment within the Project (including occupational trainings, wages, benefits, and compensation) will be based on the workers' performances rather than their gender. There should be no pay gap stemming from gender among workers as per the "equal pay for equal work" principle. There are two women employed in the Project. One is working in the kitchen and the other one is working as OHS specialist.

The Project will also ensure that the Project area has appropriate and proportional security measures (i.e., lighting, alarms, separate toilets) and a confidential grievance mechanism for the grievances related to GBVH. Regular outreach and awareness trainings will be conducted to workers in order to address GBVH risks around the Project area.

14.3.1.7 Grievance Mechanism

Internal grievance mechanism covers the grievances of all employees working under the Project Company, its contractors, subcontractors, and suppliers. The Project Company aims at creating a positive working environment based on open and continuous communication. For this purpose, the Project Company has formal employee grievance mechanisms and these practices are applied within the existing facility of the Project.

Internal grievance channels include Orange ethics hotline, e-mail address, and a system named Transparent Chair provided by the Project Company, which allows employees to raise their questions and grievances anonymously, employee committee meetings, reporting grievances to the managers and Human Resources Department representatives verbally or in a written way, E-Makin System of the Project Company, and grievance boxes placed at the Project mobilization areas.

Some improvement areas regarding the grievance mechanism have been notified during the ESIA process of the Project. Improvement areas and the details on the internal grievance mechanism of the Project are provided in detail in Section 18.6.4.

14.3.1.8 Child Labour

There will be no child labour employment in any manner that is economically exploitative, likely to be harmful hazardous to the child's physical and mental health or to interfere with the child's education. As per the IFC PS2 and EBRD PR2, the Project will identify the presence of all persons under the age of 18 and those below the age of 18 years will not be employed in hazardous works. In this regard, the Project will follow these international standards and the Turkish Labour Law No. 4857 in order to avoid child labour among its workers, contractors and subcontractors. To prevent the existence of child labour, the records of the dates of birth of all employees will be kept, verified by official documentation, and monitored on a regular basis.

Relevant corporate policies and management plans of the Project Company put emphasis on the prevention of child labour.

14.3.1.9 Forced Labour

Within the scope of the Project, the Project Company will not employ forced labour[158] covering any kind of involuntary or compulsory labour arrangements. Relevant corporate policies and management plans of the Project Company put emphasis on the prevention of forced labour.

14.3.1.10 Workers Engaged by Third Parties

For workers engaged through contractors or other intermediaries, the Project will consider the risks associated with the recruitment, engagement, and demobilisation of the Project workers by third parties. Accordingly, the Project will establish commensurate policies and procedures for managing and monitoring the performance of third-party employers in relation to the Project.

In addition, the Project will use reasonable efforts to incorporate these requirements in contractual agreements with such third-party employers and implement the Corporate Labour Management Plan, Contractor Management Plan and Supplier and Contractor Audit System Plan to ensure compliance with the Lenders' requirements.

In the case of subcontracting, the Project will take necessary steps for third parties to include equivalent requirements in their contractual agreements with their subcontractors. Such practices will be supported through inspections and audits to monitor the on-site implementation as well as trainings for capacity development and awareness raising.

14.3.1.11 Supply Chain

Risks associated with labour and working conditions as well as occupational health and safety among suppliers within the scope of the Project can be summarized as follows:

- Existence of forced labour
- Existence of child labour
- Discrimination among workers especially the vulnerable groups
- Improper retrenchment management
- Prohibitions against right to unionization
- Improper conditions at working and accommodation areas
- Risks related to wages and other benefits
- Risks related to working hours and overtime payments
- OHS practices in construction and operation phases

Additionally, suppliers are expected to respect human rights and promote gender equality. Human rights considerations should be integrated into policy frameworks, project planning, and supply chain management in order to contribute to positive Project outcomes.

The Project Company will uphold labour rights, monitor, and address human rights risks in the Project's supply chain, and establish effective grievance mechanisms to provide access to remedy for any abuses. As stated earlier, internal grievance mechanism covers the grievances of all employees working under the Project Company, its contractors, subcontractors, and suppliers. The Project Company has formal employee grievance mechanisms, which will be enabled for the access of the suppliers within the scope of the Project. Further assessment on

[158] According to the IFC Performance Standards on Environmental and Social Sustainability (2012), forced labour consists of work or service involuntarily performed that is exacted from an individual under threat of force or penalty, including through abusive and fraudulent recruitment practices.

the risks and mitigation measures associated with the supply chain in terms of human rights will be provided in the Human Rights Impact Assessment (HRIA) Report prepared specific to the Project, when the Report is finalized.

In business relations with the Project's primary suppliers, the Project Company will identify incidents or risky practices such as health and safety violations, child labour, and forced labour, and take proper measures to remedy them in line with the Lenders' requirements and standards. Corporate Supply Chain Management Plan, Supplier and Contractor Audit System Plan and Procurement Policy of the Project Company will be implemented within the scope of the Project.

For identification of further risks in addition to the above-mentioned ones and remediation of those risks, the Project Company will need to develop and implement certain strategies (i.e., evaluation forms, contracts, management plans). Where remediation is not possible, the Project Company will change the Project's primary supply chain over time so that suppliers can demonstrate that they need to comply with the Project Company's standards as per the Lenders' requirements and international best practices.

14.3.1.12 Retrenchment

Collective dismissal is regulated in Article 29 of the Labour Law No. 4857 as follows:

"When the employer wants to lay off workers collectively as a result of economic, technological, structural and similar business, workplace or work requirements, the employer notifies this at least 30 days in advance in writing to the workplace union representatives, the relevant regional directorate and the Turkish Employment Agency (IS-KUR)."

The number of workers employed at the workplace:

- If between 20 and 100 workers, at least 10 workers,
- If between 101 and 300 workers, at least 10% of the workers,
- If 301 or more, at least 30 workers,

termination of employment is regarded as collective dismissal.

In times of the requirement for retrenchment and demobilisation, a retrenchment procedure to minimize the impact of job losses on workers and communities is necessary as per the good international practices as well as Lenders' standards and requirements. Such a procedure, often encapsulated in a retrenchment plan, should be founded on widespread consultation (particularly with workers and their representatives) and should seek to ensure that the selection of workers for dismissal is based on principles that are fair and transparent and do not discriminate against particular groups. During the course of the process, efforts should be made to reduce the number of jobs that have to be lost and to mitigate the impacts of the job losses on individuals, groups, and communities.

14.4 Impact Assessment

14.4.1 Construction

14.4.1.1 Labour and Working Conditions

Working Conditions and Terms of Employment

The construction phase is planned to be completed in 13 months, by working for 24 days in each month and 10 hours and one shift per day. During the construction phase, it is crucial to provide reasonable working conditions and terms of employment for the Project workforce. The

workforce has a medium sensitivity for this impact. The magnitude of the impact is moderate, which corresponds to a moderate level of significance.

Fair Treatment, Non-Discrimination, and Equal Opportunity for Workers

There will be no tolerance of discrimination on grounds of gender, religion, political views, nationality, or social origin. Policy on People and Culture, which is one of the corporate policies of the Project Company explaining the fair treatment, non-discrimination, and equal opportunity, will be implemented, and disclosed to all workers including subcontractors. In terms of this impact, the Project workers' sensitivity is medium. This represents a moderate impact magnitude that corresponds to a moderate level of significance.

Workers' Grievance Mechanism

Project workers may not be adequately informed about the existing Project grievance mechanism as well as available grievance channels and the terms and conditions of their employment under the Project activities. Workers are sensitive to this impact at a medium level. The magnitude of the impact is moderate, resulting in an impact with a moderate level of significance.

The presence of the security personnel is assessed in *Chapter 15: Community Health and Safety.* However, presence of the security personnel may lead to labour rights violation (including gender consideration) and conflicts among the workforces. Workers are sensitive to this impact at medium level. The magnitude of the impact is moderate, which corresponds to an impact with a moderate level of significance.

Workers' Organisations

Restricting workers from developing their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment might be a risk within the scope of the Project. The workforce has a medium sensitivity for this impact. The magnitude of the impact is moderate, which corresponds to a moderate level of significance.

Management of Contractors, Subcontractors and Supply Chain (Including Child and Forced Labour)

Construction works will be performed by the main contractor and its subcontractors. The Project will work with the supplier companies for procurement of certain goods and services related to the construction activities. The contractor, subcontractors and suppliers may not have adequate knowledge of international standards and practices regarding the management of contractors, subcontractors, and supply chain. Contracted, subcontracted and supply chain workers have medium sensitivity to this impact. Both the magnitude and the level of significance of the impact are moderate.

Overtime Working without Workers' Consent and/or Compliance with National and International Requirements

EPC and its subcontractors of the Project may use compulsory overtime to complete the works on time but may not pay for overtime. On the other hand, overtime may exceed 270 hours per year. Workers are sensitive to this impact at medium level. The magnitude of the impact is moderate, which corresponds to an impact with a moderate level of significance.

Gender-Based Violence and Harassment (GBVH) Risks

GBVH risks towards the workers and residents of the Project affected villages may occur unless proper preventive measures are taken. The sensitivity of the receptors to this impact is medium and the magnitude of the impact is moderate. Overall, this results in an impact with a moderate level of significance.

Retrenchment and Demobilisation Risks

The management of the demobilisation process at the end of the Project's construction phase and retrenchment process in times of necessity may not meet the international standards. The receptors' sensitivity is medium. The magnitude of the impact is moderate, which corresponds to a moderate level of significance.

14.4.1.2 Occupational Health and Safety

Health and safety risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard. It may also apply to situations with property or equipment damage or harmful effects on environment. Considering that there is a limited capacity to estimate the likelihood of the risk within the ESIA scope, health and safety risks during construction are estimated using the methodology provided in Section 14.2.1.2.

Due to the nature of the construction works there are certain hazards which are likely to be in place or are inevitable at a construction site which poses risk of accidents with equipment and tools resulting in adverse health effects to the workers on construction site. The hazards on a construction site can be listed as following; repetitive motion, over-exertion, manual handling, slips and trips, falls from height associated with working in heights, struck by objects, ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities, moving machinery such as vehicle traffic and use of lifting equipment in the movement of machinery, dust emissions, confined space and excavations (silos, hoppers, utility vaults, tanks, sewers, pipes and access shafts, ditches and trenches when access or egress is limited), use of chemicals, hazardous or flammable materials, hazardous wastes, sharp objects, hand tools, electric tools, falling objects, noise, hot works (welding and cutting) etc.

Occupational health and safety impacts of the Project would not be different from that of any other construction project during site preparation and construction. The impacts would be localised and would only affect workers or visitors to the site. However, construction activities could present a number of common hazards to workers or visitors in the Project area such as physical hazards, electrical hazards, fire and explosion hazards.

Working at Height

Working at height is a common occurrence in all phases of wind turbine projects. While the main focus of managing work at height should be the prevention of falls, additional hazards that may need to be considered include falling objects and adverse weather conditions (wind speed, temperature extremes, humidity and wetness).

Working at Remote Locations

Planning is an essential part of ensuring the safety, health and welfare of employees when working in remote locations, particularly in the offshore site.

Lifting Operations

Lifting operations are an integral part of the construction of any wind turbine. When lifting is required in an offshore environment, it can become a very complex operation involving multiple vessels and cranes.

Hazardous Activities

Construction workers would be actively involved in potentially hazardous activities such as handling and management of hazardous chemical materials, contacting with moving parts of construction machinery the operation of heavy machinery, excavation and the handling and installation of various building materials, and appropriate personal protective measures (such as

gloves, hard hats, steel-toed boots, eye protection and ear plugs or covers) should therefore be a routine part of construction activities.

Accidents/Incidents

Potential impacts also include near misses, injuries, or incidents due to inadequate risk assessment, application of risk control measures and regular monitoring of workplace incidents.

Dust, Noise and Vibration

The generation of dust, noise, and vibration during construction activities (i.e., earthmoving, operation of equipment and vehicles, construction traffic) may also have adverse effects on the workers employed in the construction works, unless adequate measures are taken (i.e., health controls, use of Personal Protective Equipment (PPE)).

In addition, the impact due to following risks on construction workers as well as nearby communities are discussed under *Chapter 15: Community Health and Safety, Section 15.4*.

14.4.2 Operation

14.4.2.1 Labour and Working Conditions

In terms of labour and working conditions, potential impacts that may occur during the Project's operation phase are listed below.

Working Conditions and Terms of Employment

Not providing reasonable working conditions and terms of employment poses a risk for the Project workforce. The workforce has a medium sensitivity for this impact. The magnitude of the impact is moderate, which corresponds to a moderate level of significance.

Fair Treatment, Non-Discrimination, and Equal Opportunity for Workers

There will be no tolerance of discrimination on grounds of gender, religion, political views, nationality or social origin. Policy on People and Culture, which is one of the corporate policies of the Project Company explaining the fair treatment, non-discrimination, and equal opportunity, will be implemented and disclosed to all workers including subcontractors. In terms of this impact, the Project workers' sensitivity is medium. This represents a moderate impact magnitude that corresponds to a moderate level of significance.

Workers' Grievance Mechanism

Project workers may not be adequately informed about the grievance mechanism and the terms and conditions of their employment under the Project activities. Workers are sensitive to this impact at a medium level. The magnitude of the impact is moderate, resulting in an impact with a moderate level of significance.

The presence of the security personnel is assessed in *Chapter 15: Community Health and Safety.* However, presence of the security personnel may lead to labour rights violation (including gender consideration) and conflicts among the workforces. Workers are sensitive to this impact at medium level. The magnitude of the impact is moderate, which corresponds to an impact with a moderate level of significance.

Workers' Organisations

Restricting workers from developing their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment might be a risk within the scope of the Project. The workforce has a medium sensitivity for this impact. The magnitude of the impact is moderate, which corresponds to a moderate level of significance.

Gender-Based Violence and Harassment (GBVH) Risks

GBVH risks towards the workers and residents of the Project affected villages may occur unless proper preventive measures are taken. The sensitivity of the receptors to this impact is medium and the magnitude of the impact is moderate. This results in an impact with a moderate level of significance.

14.4.2.2 Occupational Health and Safety

Operation activities could present a number of common hazards to workers or visitors in the Project area and all possible hazards and risks during operation will be assessed and mitigated within the corporate OHS and safety management system, local requirements, and sectoral recommendations such as ICAO and IFC.

Working at Height

Working at height is a common occurrence in all phases of wind turbine operation and is particularly relevant for maintenance. While the main focus of managing work at height should be the prevention of falls, additional hazards that may need to be considered include falling objects and adverse weather conditions (wind speed, temperature extremes, humidity and wetness).

Working at Remote Locations

Planning is an essential part of ensuring the safety, health and welfare of employees when working in remote locations, particularly in the offshore site.

Lifting Operations

Lifting operations are an integral part of the construction of any wind turbine. When lifting is required in an offshore environment, it can become a very complex operation involving multiple vessels and cranes.

In addition, the impact due to following risks on operation workers as well as nearby communities are discussed under *Chapter 15: Community Health and Safety, Section 15.4*.

14.4.3 Summary

Table 14.8: Labour and working conditions sensitivity/value criteria for resource/receptors

Subject	High	Medium	Low	Negligible
Working Conditions and Terms of Employment	Workplace where working conditions and terms of employment do not comply with the Lenders' standards and requirements	Workplace where reasonable working conditions and terms of employment are partially provided in line with the Lenders' standards and requirements	Workplace where reasonable working conditions and terms of employment are provided in line with the Lenders' standards and requirements but in some cases fail to apply properly	Workplace where working conditions and terms of employment comply with the Lenders' standards and requirements
Fair Treatment, Non-Discrimination and Equal Opportunity for Workers	Workplace with high levels of discrimination and unequal/unfair treatment to the workers that are exposed to all Project workers	Workplace with discrimination and unequal/unfair treatment to the workers that are exposed to certain group of workers	Workplace with fair treatment, non-discrimination and equal opportunity strategy but in some cases fails to apply properly	Workplace effectively operating in line with fair treatment, non-discrimination and equal opportunity principles

Subject	High	Medium	Low	Negligible
Workers' Grievance Mechanism	Non-existence of a workers' grievance mechanism/ Resistance to establish a workers' grievance mechanism	Workers' grievance mechanism that is not accessible and transparent and that discourages workers to use properly due to risks of dismissal and retaliation	Effective workers' grievance mechanism, but with limited channels and lack of principles in terms of prioritization, resolution timeline and disclosure of the outcomes	Effectively functioning grievance mechanism
Workers' Organisations	Restricting workers from developing their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment	Not providing a transparent environment for workers to develop their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment	Providing a transparent environment for workers to develop their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment	Enabling and informing workers about their rights in order to encourage them to develop their own organisations and/or unions as well as alternative mechanisms to express their grievances and protect their rights regarding working conditions and terms of employment
Child and Forced Labour	Existence of child and forced labour under improper working conditions without any ways to remedy	Existence of child and forced labour under improper working conditions with certain ways to remedy	Existence of child and forced labour under proper working conditions with certain ways to remedy	Non-existence of child labour and forced labour
Overtime Working	Forcing the workers to work overtime under improper working conditions and not compensating the overtime worked hours	Performing overtime working with worker's consent but not compensating the overtime worked hours	Performing overtime working with worker's consent but partially compensating the overtime worked hours	Performing overtime working with worker's consent and compensating the overtime worked hours properly
Gender-Based Violence and Harassment (GBVH) Risks	Insecure conditions and lack of security measures that may lead GBVH risks occurring and make Project workers as well as local community members in the nearby villages open to abuse	Limited security measures that may not prevent GBVH risks occurring	Adequate conditions with certain security measures and strategies that prevent GBVH risks occurring but, in some cases, fail to apply properly	Optimal conditions that are applied properly with certain security measures and strategies that prevent GBVH risks occurring
Retrenchment and Demobilisation Risks	Retrenchment and demobilisation processes that do not comply with the Lenders' standards and requirements	Retrenchment and demobilisation processes that partially comply with the Lenders' standards and requirements	Retrenchment and demobilisation processes that comply with the Lenders' standards and requirements, but, in some cases, fail to apply properly	Retrenchment and demobilisation processes that comply with the Lenders' standards and requirements

Table 14.9: Impact significance during construction

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Working Conditions and Terms of Employment	All Project workers	High	Construction	Construction area	Reversible	Possible	Moderate	Medium	Moderate
Fair Treatment, Non-Discrimination and Equal Opportunity for Workers	All Project workers	High	Construction	Construction area	Reversible	Occurring under specific conditions	Moderate	Medium	Moderate
Workers' Organisations	All Project workers	High	Construction	Construction area	Reversible	Occurring under specific conditions	Moderate	Medium	Moderate
Workers' Grievance Mechanism	All Project workers	High	Construction	Construction area	Reversible	Possible	Moderate	Medium	Moderate
Management of Contractors, Subcontractors and Supply Chain (Including Child and Forced Labour)	All Project workers	High	Construction	Construction area	Reversible	Possible	Moderate	Medium	Moderate
Overtime Working without Workers' Consent and/or Compliance with National and International Requirements	All Project workers	Medium	Construction	Construction area	Irreversible unless compensated	Occurring under specific conditions	Moderate	Medium	Moderate
Gender-Based Violence and	All Project workers/ Local community members	High	Construction	Construction area	Irreversible unless compensated	Possible	Moderate	Medium	Moderate

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Harassment (GBVH) Risks	residing in the nearby villages								
Retrenchment and Demobilisation Risks	All Project workers	High	Construction	Construction area	Reversible	Occurring under specific conditions	Moderate	Medium	Moderate

Table 14.10: Occupational Health and Safety Risks During Construction

Receptor	Risk Summary	Receptor Sensitivity	Risk Likelihood	Risk Severity	Risk Rating
Construction workers and visitors	Risk of accidents in result of poor risk management	High	4: Occasional	A: Catastrophic	**4A: High Risk**
Construction workers	Risk of occupational diseases	High	3: Remote	A: Catastrophic	**3A: High Risk**

Table 14.11: Impact significance during operation

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Working Conditions and Terms of Employment	All Project workers	High	Operation	Construction area	Reversible	Possible	Moderate	Medium	Moderate

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Fair Treatment, Non-Discrimination and Equal Opportunity for Workers	All Project workers	High	Operation	Construction area	Reversible	Occurring under specific conditions	Moderate	Medium	Moderate
Workers' Organisations	All Project workers	High	Operation	Construction area	Reversible	Occurring under specific conditions	Moderate	Medium	Moderate
Workers' Grievance Mechanism	All Project workers	High	Operation	Construction area	Reversible	Possible	Moderate	Medium	Moderate
Gender-Based Violence and Harassment (GBVH) Risks	All Project workers/ Local community members residing in the nearby villages	High	Operation	Construction area	Irreversible unless compensated	Possible	Moderate	Medium	Moderate

Table 14.12: Occupational Health and Safety Risks During Operation

Receptor	Risk Summary	Receptor Sensitivity	Risk Likelihood	Risk Severity	Risk Rating
Staff and visitors	Risk of accidents in result of poor OHS risk management	High	4: Occasional	A: Catastrophic	4A: High Risk
Staff and visitors	Risk of accidents in result of earthquake and structural failure	High	2: Improbable	A: Catastrophic	2A: Moderate Risk
Staff and visitors	Risk of fire and explosion accidents	High	3: Remote	A: Catastrophic	3A: High Risk

14.5 Impact Mitigation & Residual Impact

To prevent, minimize or offset the adverse labour related impacts, mitigation measures were identified in accordance with the national regulations and laws, international standards and best practices.

14.5.1 Construction

14.5.1.1 Labour and Working Conditions

Regarding the potential impacts of the Project on labour and working conditions during the construction phase, the following mitigation and enhancement measures will be applied:

- Corporate Labour Management Plan (covering both the management of contractors and subcontractors) will be implemented.
- In case of the establishment of campsite for workers, Workers' Accommodation Plan will be developed to ensure that necessary campsite management actions are applied within the Project's mobilization area in line with the Lenders' standards and requirements.
- The main contractor will commit to the Corporate Labour Management Plan of the Project Company or establish and implement its own HR and worker management procedures covering the processes from recruitment and employment.
- Corporate Labour Management Plan together with the HR Policy and other relevant corporate policies of the Project Company as well as the HR and worker management procedures and other applicable corporate level policies of the main contractor that address non-discrimination and equal opportunity, workers' rights and benefits, right to unionization, grievance mechanism, child and forced labour in line with the national and international requirements will be implemented throughout the Project lifecycle and disclosed to all Project workers including subcontractors.
- Corporate Grievance Mechanism Procedure that involves the principles of the mechanism (including confidentiality and anonymity), available channels, defined timeframes for acknowledgement of the receipt of complaints and subsequent resolution, and management and resolution process together with the assigned responsible Project staff will be implemented. The Project Grievance Mechanism Procedure will be disclosed to all Project workers including contractor and subcontractors. Grievance mechanism channels will be enabled for the workers through which they can raise their concerns and suggestions.
- Corporate Code of Conduct for workers will be implemented together with the items that ensuring appropriate and proportional security (including GBVH risks) measures for workers (i.e., lighting, alarms, separate toilets) are provided. Code of Conduct will be disclosed to all Project workers.
- The fact that vulnerable workers (i.e., women, disabled, migrant workers) are included and protected will be ensured through the items specified within the Code of Conduct as well as Corporate Equal Opportunities Plan in line with the Lenders' standards and requirements.
- Corporate Security Personnel Code of Conduct of the Project Company will be implemented.
- The fact that the main contractor and its subcontractors follow national laws and regulations as well as international requirements in the employment of construction workers will be ensured through certain strategies (i.e., monitoring the workers' overtime consent forms, enabling the grievance mechanism). Corporate Labour Management Plan and Corporate Supplier and Contractor Audit System Plan will be applied for the Project.
- The use of all forms of child and forced labour will be prevented in contractor, subcontractor and supply chain companies through the implementation of Corporate Supply Chain Management Plan, Supplier and Contractor Audit System Plan, and Procurement Policy of the Project Company as well as the Corporate Labour Management Plan.

- Quota for the employment of woman workers to provide gender equality will be established in line with the Corporate Equal Opportunities Plan and Project Company's gender equality objectives.
- Corporate Retrenchment Policy of the Project Company will be implemented in times of the requirement for retrenchment and demobilisation.
- The Project Company will conduct periodic labour audits that will be taken internally as well as by the external parties to determine the labour management performance and identify the gaps related to the labour management as per the national legislation, Lenders' standards and requirements as well as ILO and other applicable international requirements.

14.5.1.2 Occupational Health and Safety

The mitigation measures that will be applied to reduce or avoid the potential occupational health and safety risks during the construction phase will include but not be limited to the following:

- All national health and safety regulations will be followed by the Project Company and their contractors.
- Good site management practice (training and qualification of staff, appropriate work standards) to reduce occupational health and safety risks will be implemented.
- Occupational Health and Safety Management Plan will be implemented.
- Risk assessments will be conducted.
- Emergency Response Plan which will be developed by the Consultant will be implemented.
- Supply and use of appropriate PPE will be ensured in line with international best practice and national legislation.
- Regular trainings on the possible risks regarding the work site and works to be carried out will be provided to all Project workers.
- Accident records (fatalities, lost time incidents, any significant events including spills, fire, outbreak of pandemic or communicable diseases, social unrest, etc.) will be kept in a central log properly.
- Regular inspection of equipment and vehicles will be conducted.
- Relevant monitoring parameters and implementation of regular monitoring of the occupational health and safety performance of main contractor and subcontractors will be properly defined.
- The subcontractors will also be required to follow the requirements of the Project. Contracts to be signed with subcontractors will include health and safety requirements.
- OHS mitigation measures will be designed and implemented following a structured Health and Safety Management System as defined in Occupational Health and Safety Management Plan.
- Health and safety organizational structure will be developed which involves sufficiently qualified health and safety personnel for Project specific risks.

14.5.2 Operation

14.5.2.1 Labour and Working Conditions

To address the potential impacts of the Project on labour and working conditions during operation phase, the following mitigation and enhancement measures will be applied:

- Corporate Labour Management Plan (covering both the management of contractor and subcontractor labour) will be implemented.

- Corporate Labour Management Plan together with the HR Policy and other relevant corporate policies of the Project Company that address non-discrimination and equal opportunity, workers' rights and benefits, right to unionization, grievance mechanism, child and forced labour in line with the national and international requirements will be implemented throughout the Project lifecycle and disclosed to all Project staff.
- Corporate Grievance Mechanism Procedure that involves the principles of the mechanism (including confidentiality and anonymity), available channels, defined timeframes for acknowledgement of the receipt of complaints and subsequent resolution, and management and resolution process together with the assigned responsible staff will be implemented. The Project Grievance Mechanism Procedure will be disclosed to all Project staff. Grievance mechanism channels will be enabled for the workers through which they can raise their concerns and suggestions.
- Corporate Code of Conduct for the Project staff will be implemented together with the items that ensuring appropriate and proportional security (including GBVH risks) measures for workers (i.e., lighting, alarms, separate toilets) are provided. Code of Conduct will be disclosed to all Project staff.
- Corporate Security Personnel Code of Conduct of the Project Company will be implemented.
- The fact that vulnerable workers (i.e., women, disabled, migrant workers) are included and protected will be ensured through the items specified within the Code of Conduct as well as Corporate Equal Opportunities Plan in line with the Lenders' standards and requirements.
- Quota for the employment of woman workers to provide gender equality will be established in line with the Corporate Equal Opportunities Plan.
- The Project Company will conduct periodic labour audits that will be taken internally as well as by the external parties to determine the labour management performance and identify the gaps related to the labour management as per the national legislation, Lenders' standards and requirements as well as ILO and other applicable international requirements Corporate Labour and OHS Audit System will be implemented.

14.5.2.2 Occupational Health and Safety

Regarding the potential occupational health and safety risks during the Project activities, risk assessments will be conducted to determine the complete set of measures required. At a minimum, the following mitigation measures will be applied:

- Implementation of the following as part of the ESMS: Emergency Response Plan, Corporate Community Health and Safety Plan, Corporate Hazardous Materials Management Plan, Corporate Waste Management Plan and Corporate Wastewater Management Plan.
- Regular monitoring and reporting of the occupational health and safety conditions within the Project including incidents and near misses.
- Providing a Self-Inspection Checklist for the Project personnel to fill the checklist on a regular basis and keeping the records of the checklist.
- Training workers in the use of the available information, safe work practices, and appropriate use of PPE.

14.5.3 Summary

Labour and working conditions as well as OHS related residual impacts during construction and operation phases of the Project are summarized in below tables.

Table 14.13: Labour and working conditions related residual impacts during construction

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Working Conditions and Terms of Employment	All Project workers	Moderate	Negligible
Fair Treatment, Non-Discrimination and Equal Opportunity for Workers	All Project workers	Moderate	Negligible
Workers' Organisations	All Project workers	Moderate	Negligible
Workers' Grievance Mechanism	All Project workers	Moderate	Negligible
Management of Contractors, Subcontractors and Supply Chain (Including Child and Forced Labour)	All Project workers	Moderate	Negligible
Overtime Working without Workers' Consent and/or Compliance with National and International Requirements	All Project workers	Moderate	Negligible
Gender-Based Violence and Harassment (GBVH) Risks	All Project workers/ Local community members residing in the nearby villages	Moderate	Negligible
Retrenchment and Demobilisation Risks	All Project workers	Moderate	Negligible

Table 14.14: Residual OHS Risks during construction

Receptor	Risk Summary	Receptor Sensitivity	Risk Likelihood	Risk Severity	Risk Rating
Construction Workers Visitors	Risk of accidents in result of poor safety culture	High	1: Extremely Improbable	C: Major	1C: Low Risk
Construction Workers	Risk of occupational diseases	High	1: Extremely Improbable	C: Major	1C: Low Risk

Table 14.15: Labour and working conditions related residual impact during operation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Working Conditions and Terms of Employment	All Project workers	Moderate	Negligible
Fair Treatment, Non-Discrimination and Equal Opportunity for Workers	All Project workers	Moderate	Negligible
Workers' Organisations	All Project workers	Moderate	Negligible
Workers' Grievance Mechanism	All Project workers	Moderate	Negligible
Gender-Based Violence and Harassment (GBVH) Risks	All Project workers/ Local community members residing in the nearby villages	Moderate	Negligible

Table 14.16: Residual OHS Risks during operation

Receptor	Risk Summary	Receptor Sensitivity	Risk Likelihood	Risk Severity	Risk Rating
Staff and visitors	Risk of accidents in result of poor OHS risk management	High	1: Extremely Improbable	D: Minor	1C: Low Risk
Staff and visitors	Risk of accidents in result of earthquake and structural failure	High	2: Improbable	C: Major	1C: Low Risk
Staff and visitors	Risk of fire and explosion accidents	High	2: Improbable	D: Minor	2D: Low Risk

15 Community Health and Safety

15.1 Introduction

The integration of wind power projects into communities results in transformative shifts in energy landscapes, promising sustainable solutions while concurrently giving rise to a spectrum of concerns related to community health and safety. As the multifaceted aspects of community well-being throughout the construction and operation phases of wind power initiatives are delved into, it becomes evident that fostering a balance between renewable energy development and the preservation of community health and safety is deemed paramount. This section unfolds an intricate tapestry of considerations, where the potential impacts that construction activities, turbine operations, and associated infrastructures may have on the communities that host these renewable energy ventures are examined.

This section provides an assessment of the Project health, safety and security aspects that may impact workers and nearby communities during the construction and operation phases and sets out the mitigation measures to avoid or minimize the risks together with the residual impacts that are foreseen to remain. In accordance with the requirements of the IFC PS4: Community Health, Safety and Security, potential risks, and significant adverse impacts have been identified.

Commencing with the construction phase, assessment was done to the potential implications on water quality, structural safety, life and fire safety, traffic safety, the transport of hazardous materials, disease prevention, emergency preparedness, ecosystem services, the presence of security personnel, and public access through the deployment of heavy machinery, excavation processes, and transportation activities. Each facet presents unique challenges that require thoughtful assessments and the implementation of mitigation strategies to ensure the preservation of the community's well-being.

Transitioning to the operation phase, the assessment encompasses the persistent impacts on community health and safety, including the risks associated with blade and ice throw incidents, electromagnetic interference and radiation, shadow flicker, traffic safety, abnormal load transportation, and the presence of security personnel. The ongoing dynamic introduced by the operation phase demands a nuanced understanding of risks, ranging from the visual discomfort caused by shadow flicker to the potential distractions posed by the motion of turbine blades impacting traffic safety.

Throughout these discussions, the importance of community engagement, transparent communication, and the implementation of mitigation measures emerges as a recurring theme. Striking a delicate balance between the imperative of sustainable energy generation and the preservation of community health and safety forms the essence of our exploration, emphasizing the need for collaborative efforts among wind power operators, local communities, and regulatory bodies to foster responsible and harmonious development within the renewable energy landscape.

15.2 Methodology

15.2.1 Study Area and Area of Influence

Study Area and AoI is decided to be used as described in *Chapter 13: Social Environment.*

15.2.2 Data Limitations

Available resources and desk research played a role in the preparation of this chapter. The analysis and evaluations were carried out based on the prepared National EIA report and accepting the information therein as accurate and correct.

For desktop studies, mainly the existing reports (i.e., National EIA, General Directorate of Highways data, etc.) were assumed to be accurate and based upon.

15.2.3 Applicable Guidelines and Standards

15.2.3.1 National Requirements

Within the Turkish national legislative framework, specific regulations and guidelines have been established to address community health and safety concerns arising from the development and operation of wind power plants. This chapter provides a detailed examination of the compliance requirements outlined in Turkish legislation, emphasizing the importance of aligning wind power projects with national standards to ensure responsible and sustainable development.

Environmental Impact Assessment (EIA) Regulation

Under Turkish law, the EIA Regulation plays a pivotal role in evaluating the potential impacts of wind power projects on community health and safety. Adherence to this regulation necessitates the completion of a thorough EIA process, where potential risks and mitigation measures are identified. The EIA process involves public participation, ensuring that local communities have the opportunity to voice their concerns and contribute to decision-making. Moreover, opinions from relevant public authorities are also obtained during preparation of National EIA Report. Wind power projects are required to comply with the mitigation measures outlined in the approved EIA report, addressing specific health and safety considerations identified during the assessment.

Motorway Traffic Law (2918)

The purpose of this Law is to ensure traffic order on highways in terms of life and property safety and to determine the measures to be taken in all matters concerning traffic safety. This Law covers traffic-related rules, conditions, rights and obligations, their implementation and supervision, relevant organizations and their duties, powers and responsibilities, working procedures and other provisions.

Regulation On Preventing Major Industrial Accidents and Reducing Their Impacts (OG Date/Number: 02.03.2019/30702)

The Regulation on Preventing Major Industrial Accidents and Reducing Their Impacts, officially published in Official Gazette dated 2 March 2019 numbered 2019/30702, stands as a comprehensive framework within the Turkish legislative landscape. This regulation is a pivotal component of the national commitment to enhancing industrial safety and minimizing the potential consequences of major accidents. It delineates the standards and protocols aimed at preventing, preparing for, and mitigating the impacts of industrial incidents that could pose substantial risks to the environment, public health, and safety. The regulation mandates the identification of major accident hazards, requiring industries to develop and implement risk management strategies, emergency response plans, and safety measures. Through this legal

instrument, Turkish authorities underscore their dedication to fostering a proactive approach to industrial safety, ensuring that industries operating within the country adhere to stringent measures aimed at averting major accidents and safeguarding the well-being of both the environment and the communities in proximity.

Environmental Noise Regulation

Mitigating the impact of noise pollution is a key aspect of compliance with Turkish legislation. The Noise Pollution Control Regulation establishes permissible noise limits for wind power plants, ensuring that operational activities do not exceed levels that may adversely affect the health and well-being of local residents. Compliance involves continuous monitoring of noise emissions and the implementation of measures to mitigate any identified issues. The details are provided in *Chapter 9: Noise and Vibration.*

Regulation on Controlling Industrial Air Pollution (RCIAP)

Within the framework of national legislation, limit values for all kinds of industrial activities are given in the RCIAP. Ambient air limit values are provided in Annex-2 Table 2.2 of RCAPOI and these limit values decrease gradually over the years until 2024. The details are provided in *Chapter 7: Air Quality.*

Legislative Framework regarding Water

Legislative Framework regarding water quality and availability is provided in *Chapter 5: Water Quality, Hydrology and Hydrogeology* in detail.

Compliance with the Turkish National Legislative Framework is essential for wind power projects operating within the country. By aligning with regulations such as the EIA Regulation, OHS legislation, zoning plans and land use regulations, and the Noise Pollution Control Regulation, wind power projects contribute to the responsible and sustainable development of the renewable energy sector in Türkiye. This legislative framework emphasizes the importance of protecting both workers and local communities, fostering a harmonious coexistence between wind power projects and the broader societal context.

15.2.3.2 International Requirements

International financial institutions and development organizations have established a framework of standards to guide the development of wind power projects, emphasizing environmental and social responsibility. Among these standards are the IFC PS 4, IFC General EHS Guidelines: Community Health and Safety, IFC EHS Guidelines: Wind Energy, and EBRD PR 4. Compliance with these standards is imperative for the sustainable development and responsible operation of wind power projects globally.

This section provides an overview of the international regulatory framework and applicable standards for the Project, which include international requirements including the Environmental and Social Framework of the World Bank and relevant European Union (EU) directives.

International Finance Corporation (IFC) Performance Standard 4

IFC PS 4 is a cornerstone in ensuring the community health and safety of the projects. By adhering to this standard, wind power projects commit to identifying and addressing potential health and safety risks to the communities in which they operate. This includes comprehensive risk assessments, community engagement, and the implementation of measures to prevent and mitigate adverse impacts. Compliance with Performance Standard 4 ensures that the project aligns with international best practices and contributes to the overall well-being of the communities affected.

IFC General EHS Guidelines: Community Health and Safety

The IFC General EHS Guidelines further delve into Community Health and Safety aspects applicable to a broad range of industries, providing a comprehensive reference for wind power projects. The adherence to these guidelines ensures the incorporation of key principles, such as community engagement, risk assessment, and the implementation of measures to prevent accidents and mitigate potential adverse impacts on health and safety. This promotes a holistic approach to community well-being throughout the life cycle of the wind power project.

IFC EHS Guidelines: Wind Energy

Tailored specifically for the wind energy sector, the IFC EHS Guidelines: Wind Energy provide detailed guidance on the environmental and social aspects unique to wind power projects. By aligning with these sector-specific guidelines, projects contribute to the sustainability of the wind energy sector and mitigate potential adverse effects on the environment and local communities. Within this scope, abnormal load transportation during construction, blade and ice throw, aviation related risks, electromagnetic and radiation impacts, shadow flicker shall be assessed within the scope of a WPP Project.

EBRD Performance Requirement 4

The EBRD PR 4 focuses on Community Health, Safety, and Security, mirroring the IFC's commitment to these crucial aspects of project development. Adherence to this requirement reinforces the importance of identifying, preventing, and mitigating potential adverse impacts on community health and safety. Compliance with EBRD standards aligns wind power projects with internationally recognized benchmarks, enhancing their credibility, and contributing to the responsible and sustainable growth of the renewable energy sector.

15.3 Baseline Description

15.3.1 Infrastructure

Baseline descriptions regarding the infrastructural conditions (i.e., health services, water supply, sewerage, agricultural infrastructure) in the Project area are described in Section 13.3.5.

15.3.2 Life and Fire Safety and Emergency Response

Disaster and Emergency Management Authority (AFAD) is an institution working to prevent disasters, minimize disaster-related damages, plan and coordinate post-disaster response, and promote cooperation among various government agencies. In this regard, AFAD introduced a disaster management model which prioritizes Türkiye's transition from crisis management to risk management, which came to be known as the Integrated Disaster Management System. AFAD currently has 81 provincial branches across Türkiye in addition to eleven search and rescue units.

There is an operating police department, hospital, and a fire station that are located in Gürün district. The distance between the hospital and the Project area is approximately 18 km. (Figure 15.1).

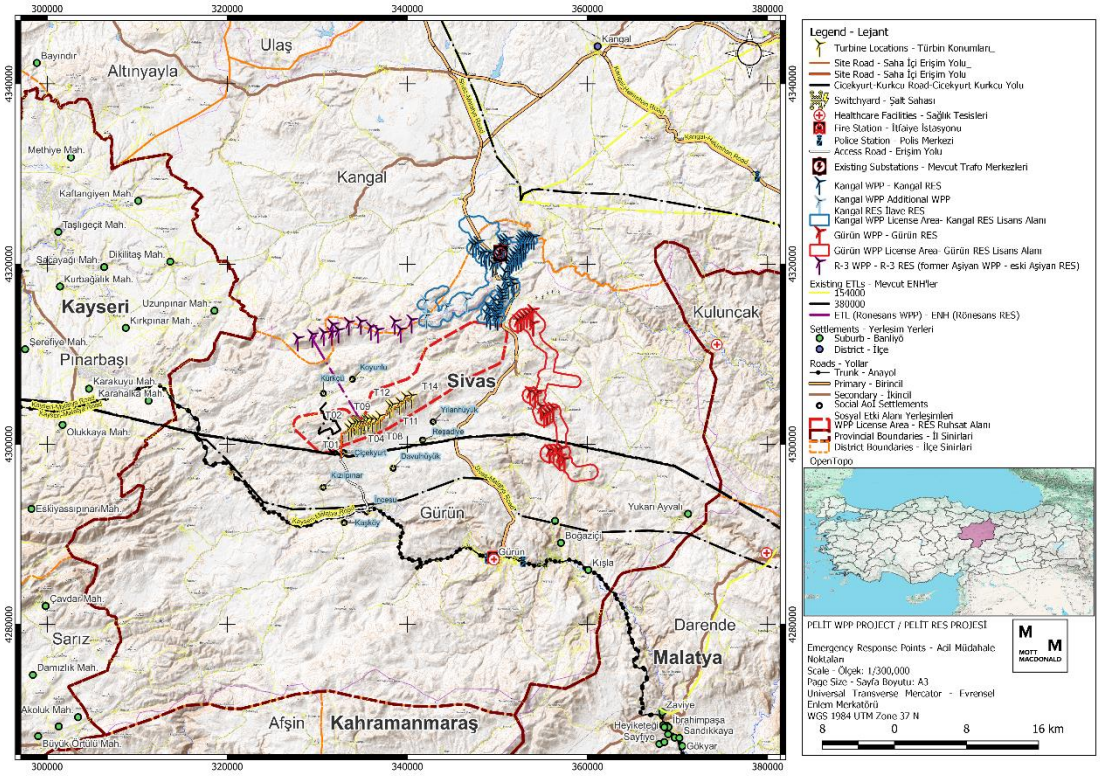


Figure 15.1: Emergency response points

15.3.3 Traffic & Transport

The baseline status of traffic and transport features of Project area and its close vicinity have been examined in order to understand current access to the site and traffic loads. Within this scope, information regarding the baseline status is obtained by examining the below listed documentation:

- Pelit Wind Power Plant (WPP) Project National EIA Report, 2018, ENÇEV
- Open Street Map Geodatabase (https://www.openstreetmap.org/)
- General Directorate of Highways, 16th Regional Division Traffic Volume Maps

During transport within the scope of the project; the provisions of the Highway Traffic Law No. 2918, the "Transport Law" No. 4925, the "Highway Traffic Regulation" No. 23053, the "Regulation on the Facilities to be Built and Opened on the Side of the Highways" published in the official gazette No. 23222 will be complied with.

Within the scope of the Project, enhancements (mostly widening) will be made to the current access roads to improve the execution of transport operations throughout the land preparation and construction stages, such as the secure transport of construction machinery to the Project site. Furthermore, the Project will include the construction of an additional access road with a width of 4 m and approximately 18.1 km length. The access road will be connected to the stabilised road between D300 Kayseri-Malatya Road Connection via the Çiçekyurt Village Road. Surrounding roads and highways around the Project area are presented in Figure 15.2.

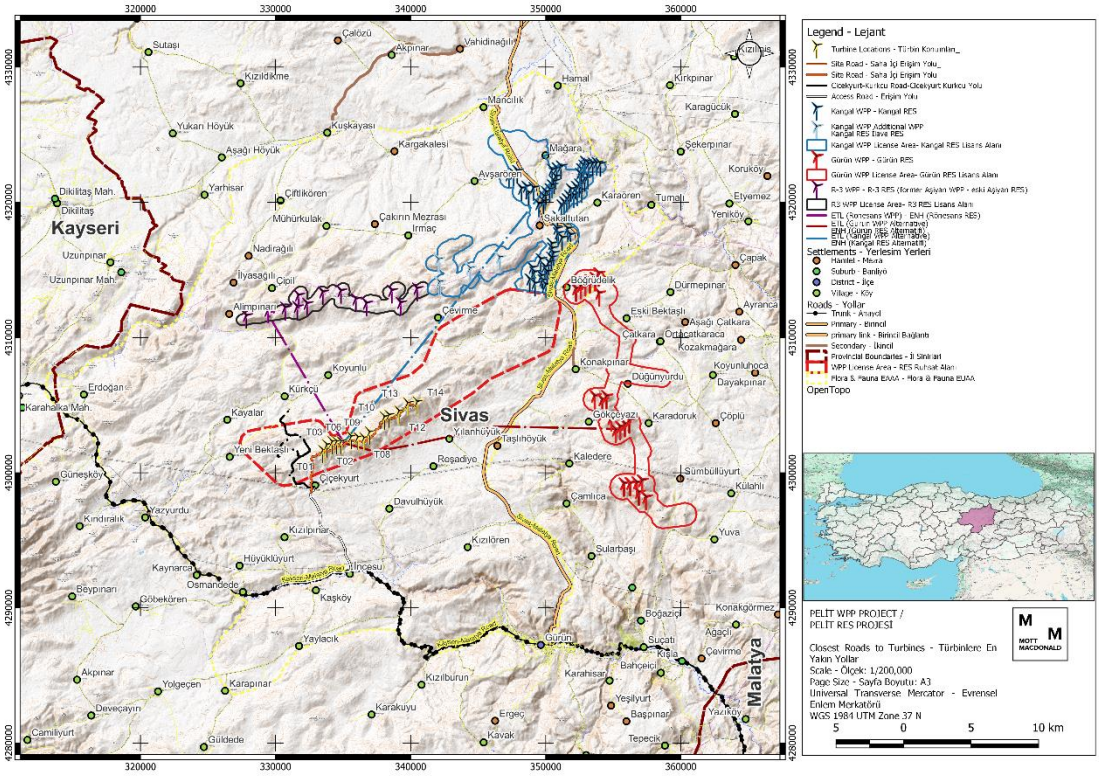


Figure 15.2: Surrounding Roads and Highways Around the Project Site

The minimum distance rule of the Wind Power Plants to the highway line specified in the study of the General Directorate of Highways regarding the WPP highway safety distances shall be complied with.

As described Figure 15.2, the Project area is located within the jurisdiction of General Directorate of Highways, the 16th Regional Division. As such, the traffic volume map of the General Directorate of Highways, the 16th Regional Division is assessed under this scoping study. Traffic volumes at locations prior to and after the connection point through the Çiçekyurt Village Road to the D300 Kayseri-Malatya Road is provided in Figure 15.3.

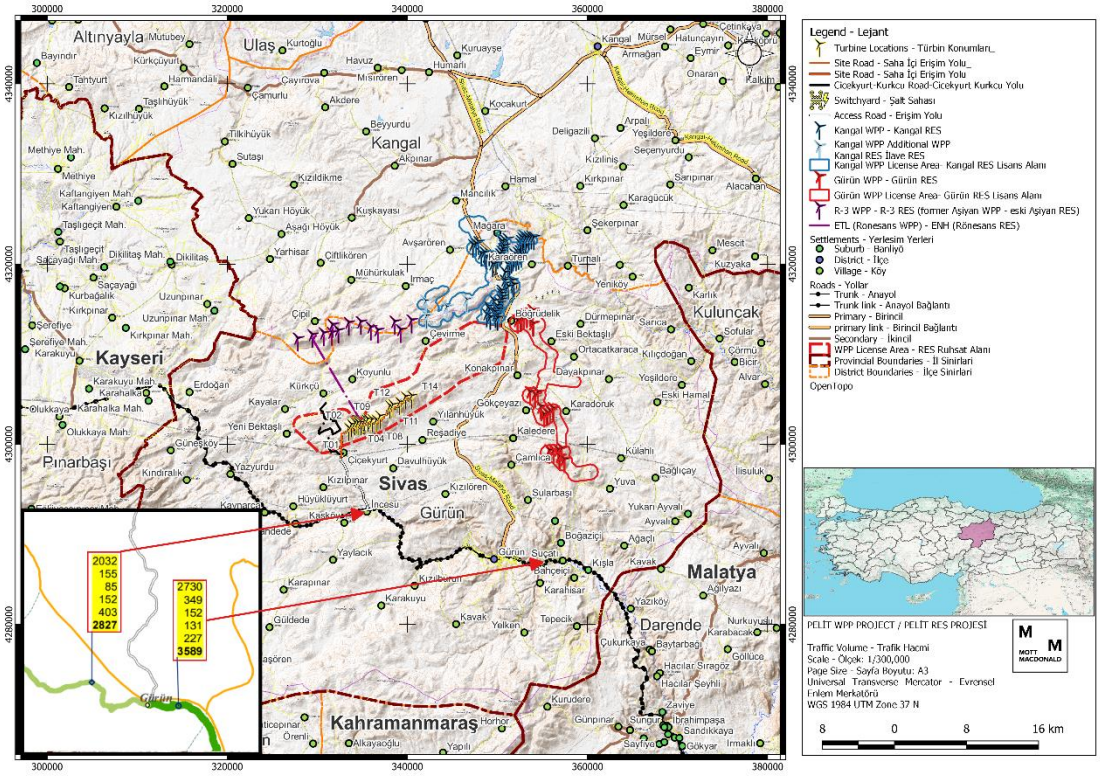


Figure 15.3: Traffic Density of D300 Highway at the Project Access Road Connection

The average annual traffic volume of the Çiçekyurt Village Road connection is 2,827 vehicles/day (2,032 Automobiles, 155 medium load commercial vehicles, 85 busses, 152 trucks, and 403 trailers, tractors, semi-trailers); the average annual traffic volume of the D300 Kayseri-Malatya Road is 3,589 vehicles/day (2,730 Automobiles, 349 medium load commercial vehicles, 152 busses, 131 trucks, and 227 trailers, tractors, semi-trailers).

The Project is scheduled to employ a total of 50 individuals throughout the construction period. Since no workforce accommodations are planned, construction staff are likely to commute to the project site using personnel shuttles. The Traffic Management Plan contains data about the staff shuttle routes.

15.3.4 Water, Air Quality, Noise

Baseline descriptions with respect to status of water bodies, ambient air quality and noise conditions in the Project area are described in the relevant chapters of this ESIA report, *Chapter 5: Water Quality, Hydrology and Hydrogeology*, *Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration*, respectively.

15.3.5 Community Grievances

The Project has an external grievance mechanism in place to receive and manage the grievances reported by community members and all other external stakeholders. The existing grievance mechanism will be revised to comply with international requirements. Details on the external grievance mechanism to be revised and implemented within the scope of the Project are given in the *Chapter 18: Stakeholder Engagement, Information Disclosure and Consultation*.

During the site visit consultations in January 2024, no concerns were reported by the mukhtars and local community members with regards to community health and safety. The concerns were

mostly related to the damage to and/or difficulty in access to infrastructural services (i.e., roads, water supply network) due to the Project.

Moreover, in December 2023, the Project Company conducted Environmental and Social Due Diligence (ESDD) activities, interviewing six mukhtars from village settlements. The mukhtars had limited knowledge about the Project, primarily concerned about traffic impacts and inadequate road infrastructure. They requested village road improvements and local employment opportunities. Kangal WPP representatives, who operate near the Project area, expressed concerns about the construction timeline and workload. However, they showed a positive approach towards collaboration to mitigate risks.

Regarding the parts remaining in agricultural areas, permission for non-agricultural use will be obtained according to Article 13 of the Soil Conservation and Land Use Law No. 5403. According to the permissions to be received from the Ministry of Agriculture and Forestry, there are no agricultural infrastructure on these routes that would prevent the land use.

15.4 Impact Assessment

15.4.1 Construction

In the context of the assessment of impacts on community health and safety, it is imperative to thoroughly examine the potential impacts on community health and safety arising from the construction activities associated with the installation of wind turbines, the development of access roads, and the establishment of electricity transmission lines. This comprehensive evaluation encompasses various dimensions, ranging from water quality and traffic safety to disease prevention and the safeguarding of ecosystem services. The unique topographical challenges of a mountainous and rocky terrain add layers of complexity to these considerations, demanding a nuanced understanding of the potential impacts on the surrounding communities and environments.

The construction phase is a dynamic and transformative period, shaping not only the physical landscape but also the social and environmental fabric of the areas involved. It is during this phase that the intricate balance between energy development and the well-being of local communities must be carefully examined. This examination delves into the foreseen impacts across various domains, offering insights into the potential risks and considerations that must be taken into account for a responsible and sustainable execution of wind power projects.

Recognizing and understanding the potential impacts on community health and safety during the construction phase is pivotal for ensuring that the benefits of renewable energy are achieved without compromising the well-being of the communities involved. This chapter assesses the multifaceted impacts, acknowledging the complexities and interconnectedness of factors that must be navigated to strike a balance between renewable energy development and the preservation of community health and safety.

15.4.1.1 Water, Noise and Air Quality

The construction phase of the Project brings forth potential impacts on water quality and availability that warrant careful consideration. Excavation process has the potential to dislodge sediment, leading to increased sedimentation in nearby water bodies. This sedimentation can compromise the quality of water by altering its clarity and introducing particulate matter. Moreover, the intensified demand for water during construction, for purposes like dust suppression and concrete mixing, may strain existing water sources. The heightened demand has the potential to disrupt the natural flow and availability of water, affecting both local communities and ecosystems dependent on these water resources.

Within the scope of the impact assessment studies' the impacts listed below were assessed within the *Chapter 5: Water Quality, Hydrology and Hydrogeology* in detail.

- Runoff from construction of temporary and permanent impermeable hard surfaces
- Stormwater runoff resulting from precipitation and drainage.
- Groundwater contamination

The importance of the impact has been deemed to be insignificant and minor for surface water and groundwater, respectively, given drinking water will be provided via bottled water and groundwater allotment is limited. Furthermore, potable water will be acquired from neighbouring settlements. Surface water and groundwater resources are unlikely to be exploited directly and have a modest influence. There is no agricultural infrastructure on the footprint of the Project area.

During the construction phase, air emissions from heavy machinery, transportation vehicles, and dust stirred up during earthworks can temporarily degrade local air quality. Additionally, wind power plant construction introduces temporary noise disturbances to the surrounding environment. Construction equipment, and foundation work generate noise that can affect nearby communities. Settlements located near the access road, people carrying out livestock activities, and passengers using roads nearby the construction may be subject to these emissions and noise generation.

Additionally, impacts regarding air quality and noise were described in Chapter 7: Air Quality and *Chapter 9: Noise and Vibration*, respectively.

15.4.1.2 Structural Safety of Project Infrastructure

The alteration of the mountainous landscape during the construction of the Project introduces significant impacts on the structural safety of project infrastructure. Excavation activities can modify the stability of the terrain, increasing the risk of geological hazards such as landslides. These hazards pose a direct threat to the structural integrity of newly constructed components, including wind turbines and access roads. Additionally, the changes to the landscape may indirectly impact nearby buildings and structures if there were any, as alterations in the terrain dynamics could compromise the stability of the surrounding area.

According to the Project's National EIA, there are erosion-prone regions near Turbines T4 and T5, located in the west and southeast, respectively. It has also been shown that areas not intended to be constructed have high and very high risk of erosion. In addition to that, as stated in the National EIA of the Project, according to the records of the General Directorate of Mineral Research and Exploration there is an active landslide area located south of the Project area, roughly 7.3 km away. However, there are no current (or previously active) slides or creeps in the Project area.

Furthermore, Sivas province is divided into regions with earthquake risk levels of 1st, 2nd, 3rd, and 4th, with the Project area falling into the 4th category and the Project area and its surroundings are located close to the 4th degree Earthquake Zone.

Hence, as described in Chapter 6: Land Use, Soil and Geology, the Project area necessitates a thorough analysis to comprehensively understand the potential consequences of the proposed WPP as the impact significance is evaluated as major. However, after taking necessary mitigation measures, it is foreseen that, minor risk regarding structural safety will be in question.

15.4.1.3 Life and Fire Safety (L&FS)

Life and fire safety considerations become paramount during the construction phase of the Project, particularly in the context of the mountainous and rocky environment. The installation of

wind turbines and associated electrical infrastructure adds another layer of fire risk, with potential electrical malfunctions during construction. These activities collectively increase the vulnerability of the construction site to fire incidents, jeopardizing the safety of both construction workers and nearby communities. The dynamic nature of construction, involving heavy machinery and equipment, underscores the importance of robust life and fire safety measures to prevent accidents and ensure a swift and effective response to emergencies.

It shall be noted that settlements around the WPP License Area is located significantly far away from the Project Area and there is no forest land around the Project area. Thus, it can be said that a fire risk that is likely to affect nearby settlements to be triggered by the construction activities is unlikely. Moreover, there is an operating police department, hospital, and a fire station that are located in Gürün district. The distance between the hospital and the Project Area is approximately 18 km. (Figure 15.1).

15.4.1.4 Traffic Safety

The construction-related activities associated with the Project introduce noteworthy impacts on traffic safety. The transportation of heavy machinery, materials, and increased movement of construction vehicles can lead to altered traffic patterns and heightened risks of accidents. The presence of large construction vehicles poses challenges to the safety of both construction workers and local residents. The changed traffic dynamics may create unfamiliar conditions for local drivers and pedestrians, increasing the likelihood of accidents and necessitating careful management of traffic flow to minimize potential hazards. The traffic load due to WPP Construction can be calculated as below.

Table 15.1: Number of Vehicles required WPP Construction

Type of Vehicle	Number of Vehicles
Truck	10
Excavator	3
Grader	2
Cylinder	1
Water Truck	2
Fuel Truck	1
Large Crane	2
Small Crane	2
JCB	4
Loader	3
TOTAL	**30**

The average annual traffic volume of the Çiçekyurt Village Road connection is 2,827 vehicles/day (2,032 Automobiles, 155 medium load commercial vehicles, 85 busses, 152 trucks, and 403 trailers, tractors, semi-trailers); the average annual traffic volume of the D300 Kayseri-Malatya Road is 3,589 vehicles/day (2,730 Automobiles, 349 medium load commercial vehicles, 152 busses, 131 trucks, and 227 trailers, tractors, semi-trailers). Hence,

$$\%\ Impact\ on\ Traffic\ Load = {Project'\ s\ Traffic\ load}/{(Project'\ s\ Traffic\ load + Exisiting\ Traffic\ Load)}$$

Çiçekyurt Village Road

$$\%\ Impact\ on\ Traffic\ Load = {30}/{(30 + 2{,}827)} = \mathbf{1.05}\%$$

D300 Kayseri-Malatya Road

$$\%\ Impact\ on\ Traffic\ Load = {}^{30}/_{(30 + 3{,}589)} = \mathbf{0.83}\%$$

As it can be seen from the calculation, the impact of the Project construction on the existing traffic load is not significant. It also shall be noted that, as described in Chapter 13: Social Environment, majority of the people living nearby settlements are carrying out livestock activities. Thus, interaction between the local agricultural activities and Project construction activities can be considered as negligible. Moreover, the traffic load of ETL construction can be calculated as below:

Table 15.2: Number of Vehicles required for ETL Construction

Type of Vehicle	Number of Vehicles
Truck	2
Excavator	1
Concrete Pump	1
Concrete Mixer	1
Water Truck	1
Crane	1
Wire Drawing Machine	1
TOTAL	**8**

Accordingly:

Çiçekyurt Village Road

$$\%\ Impact\ on\ Traffic\ Load = {}^{8}/_{(8 + 2{,}827\ )} = \mathbf{0.28}\ \%$$

D300 Kayseri-Malatya Road

$$\%\ Impact\ on\ Traffic\ Load = {}^{8}/_{(8 + 3{,}589\ )} = \mathbf{0.22}\ \%$$

There are no schools in Çiçekyurt village. However, increased traffic volume during the construction phase throughout the access roads to the Project area may result in road traffic safety risks. Yet, during the operation and construction periods of the existing plan, no significant impact on safety of passengers and drivers was observed. Hence, the magnitude of the impact and the sensitivity of the social receptors regarding this impact are moderate and low respectively, which leads to an overall minor significance within the impact assessment.

Hence, the magnitude of the impact and the sensitivity of the social receptors regarding this impact are moderate and low respectively, which leads to an overall minor significance within the impact assessment.

It also shall be noted that only Project vehicles will use the designated access roads. This will minimize the impact on the additional traffic load and its adverse impacts. In addition, within the scope of security management issues, only Project vehicles and vehicles with necessary permit to be obtained from the HSE teams of the site will be allowed to enter Project area. In addition, HSE Teams will make sure necessary signs are in place for speed limits. In addition, ad-hoc audits on the access roads will take place to make sure the relevant traffic management mitigation measures are being complied by the staff.

15.4.1.5 Abnormal Load Transportation

The transportation of oversized and heavy components, often termed as abnormal load transportation, is a critical aspect during the construction and maintenance phases of a wind power plant. Specialized vehicles are required to transport large components such as wind turbine blades, tower sections, and nacelles. The transportation of these oversized loads poses unique challenges to traffic safety and infrastructure. The sheer size and weight of these components demand careful route planning to avoid obstacles, narrow passages, and areas with weight restrictions. The presence of abnormal load convoys can temporarily disrupt regular traffic patterns, leading to potential delays and congestion. However, no residential area will be impacted by the route of turbine blades. Wind power operators must coordinate closely with local transportation authorities to obtain necessary permits, plan optimal routes, and communicate effectively with the community to minimize the impact of abnormal load transportation on local traffic and infrastructure.

15.4.1.6 Transport and Storage of Hazardous Materials

The transportation and storage of hazardous materials during the construction phase pose distinct impacts on community health and safety. Materials critical to construction activities, such as fuels, lubricants, and construction substances, may present risks if not handled with the utmost care. The movement of these hazardous materials through local areas heightens the potential for accidental spills or leaks, endangering both the immediate environment and community health. The proper management of transportation routes and secure storage facilities becomes crucial to mitigating the risks associated with the transport and handling of these potentially harmful substances. The majority of the chemicals in question of transportation and storage is related with painting, cleaning, fuelling, and small construction works. The materials are planned to be stored in small quantities and procured as frequently as possible. Thus, the storage area is not expected to be occupying a large area. Also, as described in Section 15.4.1.5, the main route to the Project area is not planned to pass through settlements nearby so, the chemical transportation is not expected to pose a major threat to local communities.

In addition, as described in *Chapter 6: Land Use, Soil and Geology,* limited impact is foreseen about soil contamination, as the no significant chemical and hazardous management is expected.

15.4.1.7 Disease Prevention

Construction activities of the Project introduce impacts on disease prevention within the community. The movement of construction workers, along with the introduction of construction-related activities (dust emission, exposure to chemical material), may create environments conducive to the spread of diseases. Increased human mobility can facilitate the transmission of infectious agents within the community, especially if proper health and safety measures are not in place. Additionally, changes in the local environment due to construction and air emissions, may attract disease vectors, further heightening the risk of disease transmission via waterborne (due to water contamination) and airborne (due to dust emission). Adequate measures for sanitation, hygiene, and health monitoring are essential to minimize the potential impact on community health during the construction phase. Nevertheless, it shall be noted that due to the scale and timeframe of the planned construction activities, and minimized risk of air emission and groundwater contamination, the disease spread risk for the communities located in Social AoI will be insignificant.

15.4.1.8 Emergency Preparedness and Response

The construction phase necessitates a comprehensive examination of emergency preparedness and response. The dynamic nature of construction activities, coupled with the presence of heavy machinery and the potential for accidents, underscores the importance of effective emergency protocols. Inadequate emergency preparedness could lead to delays in response times, increasing the severity of incidents.

During the construction phase of the Project, various activities such as site preparation, foundation installation, and turbine erection can pose risks to the local community's safety. These activities may involve heavy machinery, increased traffic, and construction materials, which can lead to accidents, air and noise pollution, and disruption of local infrastructure. Additionally, the influx of construction workers and equipment may strain existing emergency response capabilities, thereby heightening the potential for incidents and emergencies.

The construction of the Project can exacerbate existing risks to local communities' safety associated with emergencies. For instance, the installation of turbines and transmission lines may increase the likelihood of electrical hazards, such as electrocution or fire, especially in areas prone to extreme weather events like storms or wildfires. Moreover, the transportation of large turbine components through local roads can escalate traffic accidents and road closures, impeding emergency services' access to affected areas during crises.

Furthermore, the construction phase of the Project may contribute to community health concerns due to dust emissions, noise pollution, and disruption of ecosystems. Dust generated from construction activities can exacerbate respiratory problems and other health issues among vulnerable populations, while continuous noise from machinery and transportation can affect residents' quality of life and sleep patterns. Additionally, disturbances to local habitats and ecosystems may indirectly impact community health by altering air and water quality, further underscoring the need for comprehensive health and safety measures.

To address these potential impacts and risks, robust emergency preparedness and response plans must be implemented throughout the construction phase of the wind power plant Project. This includes conducting thorough risk assessments, establishing clear communication channels with local authorities and residents, and providing adequate training for construction personnel on emergency procedures. Moreover, the development of evacuation routes, emergency shelters, and medical facilities can enhance the community's resilience and capacity to respond effectively to emergencies, ensuring their safety and well-being throughout the Project's lifecycle.

The presence of multiple risk factors, including the installation of electrical infrastructure, necessitates a tailored and well-coordinated emergency response plan. Regular drills and training for construction personnel are imperative to ensure a prompt and efficient response to emergencies, safeguarding both workers and the surrounding community. Earthquake risk, erosion risk and potential structural stability risks associated with engineering structures are assessed in *Chapter 6: Land Use, Soil and Geology.*

15.4.1.9 Explosive Use and Blasting

Blasting activities to be used in construction, can significantly impact community health and safety. One of the primary concerns is the generation of dust and noxious fumes, which can contain harmful particulates such as silica, lead, and other toxic metals[159]. Inhalation of these substances can lead to severe respiratory disorders, including silicosis and lung cancer[160].

[159] https://www.osha.gov/sites/default/files/publications/OSHA3697.pdf

[160] https://kabrasives.com/blog/essential-safety-precautions-for-sandblasting-operations/

Additionally, the noise from blasting can cause hearing loss and stress-related health issues among nearby residents. The vibrations from blasts can also damage buildings and infrastructure, leading to potential safety hazards. Moreover, blasting can produce fly rock, which are fragments of rock propelled by the blast, posing a direct physical danger to people and property[161].

To mitigate these risks, strict safety protocols and regulations are essential, including proper site security, monitoring of environmental impacts, and community engagement to ensure that residents are informed and prepared for blasting activities[162].

Within the scope of the Project, blasting will take place ate Switchyard Location, and Turbines T1, T4, T10, T12, T13 and T14.

Table 15.3 details the use of explosives in blasting activities, highlighting the quantities and frequencies involved according to the blasting permit obtained from the Provincial Directorate of Environment, Urbanization and Climate Change. Blasting will be done 8 times a month, with each session involving 222 holes and 1 kg per hole, leading to an annual usage of 8880 kg. With this regard, ANFO will be used, with each hole requiring 18.35 kg, resulting in an annual usage of 162,948 kg.

Table 15.3: Blasting Details

Blasting Frequency (Times/Year)	Number of Holes (Piece)	Explosive Type	Unit	Quantity to use per hole	Minimum amount to be used at one time	Maximum amount to be used at one time
8 times/month 40 times/150 days	222	Dynamite	piece	1	222	8,880
		ANFO	kg	18.35	4,073.70	162,948
		Inter-row delay capsule	piece	-	10	400
		Electric capsule	piece	-	5	200
		Non-electric capsule	piece	2	444	17,760

One of the main risks regarding the blasting activities is the fly rock phenomenon. Fly rock is a phenomenon in mining and quarrying where rock fragments are ejected from a blast site, posing significant safety risks. Understanding the mechanisms behind fly rock can help mitigate these risks. Here are the primary mechanisms:

- *Faceburst:* This occurs when the explosive force is directed towards the face of the rock, causing it to burst outward. This can happen if the burden (the distance between the blast hole and the rock face) is too small, leading to an uncontrolled release of energy1[163].
- *Cratering:* This mechanism involves the creation of a crater on the surface of the rock. It happens when the explosive force is directed upwards, causing the rock to be thrown out from the blast hole. This is often due to insufficient stemming (material used to fill the blast hole above the explosive) or improper blast design[164].

[161] https://atlantech.com.au/2024/05/23/the-high-stakes-relationship-between-blasting-environment-and-community/

[162] Blasting Safety – Revisiting Site Security (cdc.gov)

[163] Apresentação do PowerPoint (o-pitblast.com)

[164] Hudaverdi, T., Agan, Y. Application of Intelligent Models for Flyrock Prediction Considering Design Parameters and Bench Face Characteristics. Mining, Metallurgy & Exploration 40, 2331–2347 (2023). https://doi.org/10.1007/s42461-023-00879-y

- *Rifling:* Rifling occurs when the stemming material or rock particles are ejected from the collar region of the blast hole. This can be caused by the sudden release of blast gases, often due to inadequate or inappropriate stemming material. [165]

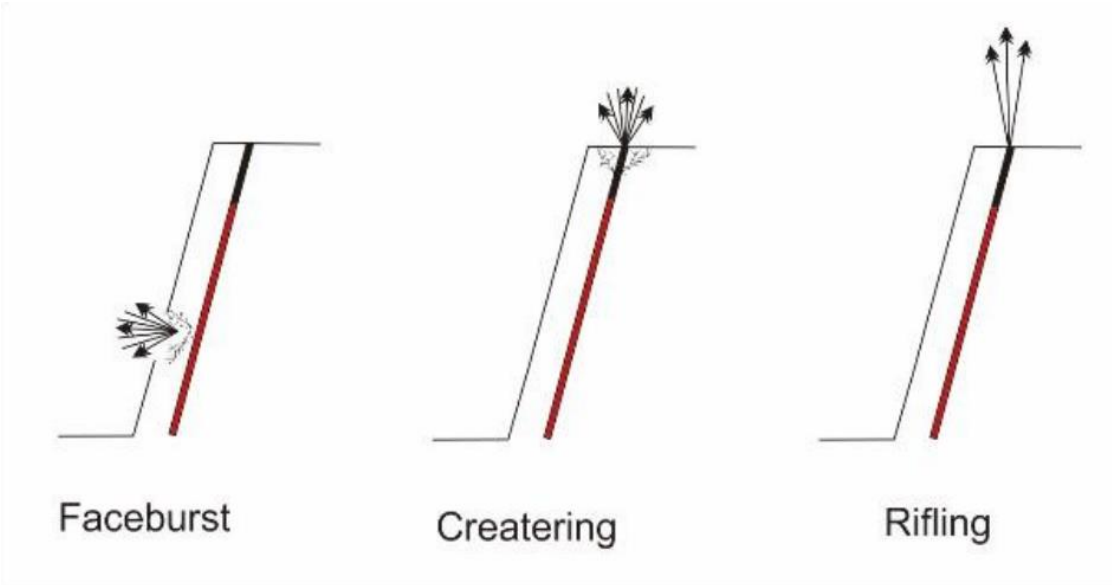


Figure 15.4: Key mechanisms of fly rock[166]

Source: M R Eko et al 2023 IOP Conf. Ser.: Earth Environ. Sci. 1175 012002

Various empirical models are available in the literature for estimating the fly rock distance during blasting. With this regard, three different empirical models were considered to calculate the distances for different fly rock mechanisms.

Table 15.4: Formulas of Key Mechanisms[167]

Mechanism	Formula	Description
Face burst	$L_{max} = \frac{k^2}{g}\left(\frac{\sqrt{m}}{B}\right)^{2.6}$	L_{max} is the maximum fly rock distance (m), g is the gravitational acceleration (9.8 m/s^2), m is the explosive charge mass per meter (kg/m), B is the initial burden (m), and k is the rock constant
Cratering	$L_{max} = \frac{k^2}{g}\left(\frac{\sqrt{m}}{SH}\right)^{2.6}$	L_{max} is the maximum fly rock distance (m), g is the gravitational acceleration (9.8 m/s2), m is the explosive charge mass per meter (kg/m), SH is the stemming height (m), and k is the rock constant
Rifling	$L_{max} = \frac{k^2}{g}\left(\frac{\sqrt{m}}{SH}\right)^{2.6} \sin 2\theta$	L_{max} is the maximum fly rock distance (m), g is the gravitational acceleration (9.8 m/s^2), m is the explosive charge mass per meter (kg/m), SH is the stemming height (m), k is the rock constant, and θ is the blast-hole angle.

[165] Hudaverdi, T., Agan, Y. Application of Intelligent Models for Flyrock Prediction Considering Design Parameters and Bench Face Characteristics. Mining, Metallurgy & Exploration 40, 2331–2347 (2023). https://doi.org/10.1007/s42461-023-00879-y

[166] M R Eko et al 2023 IOP Conf. Ser.: Earth Environ. Sci. 1175 012002

[167] https://www.degruyter.com/document/doi/10.1515/geo-2022-0624/html

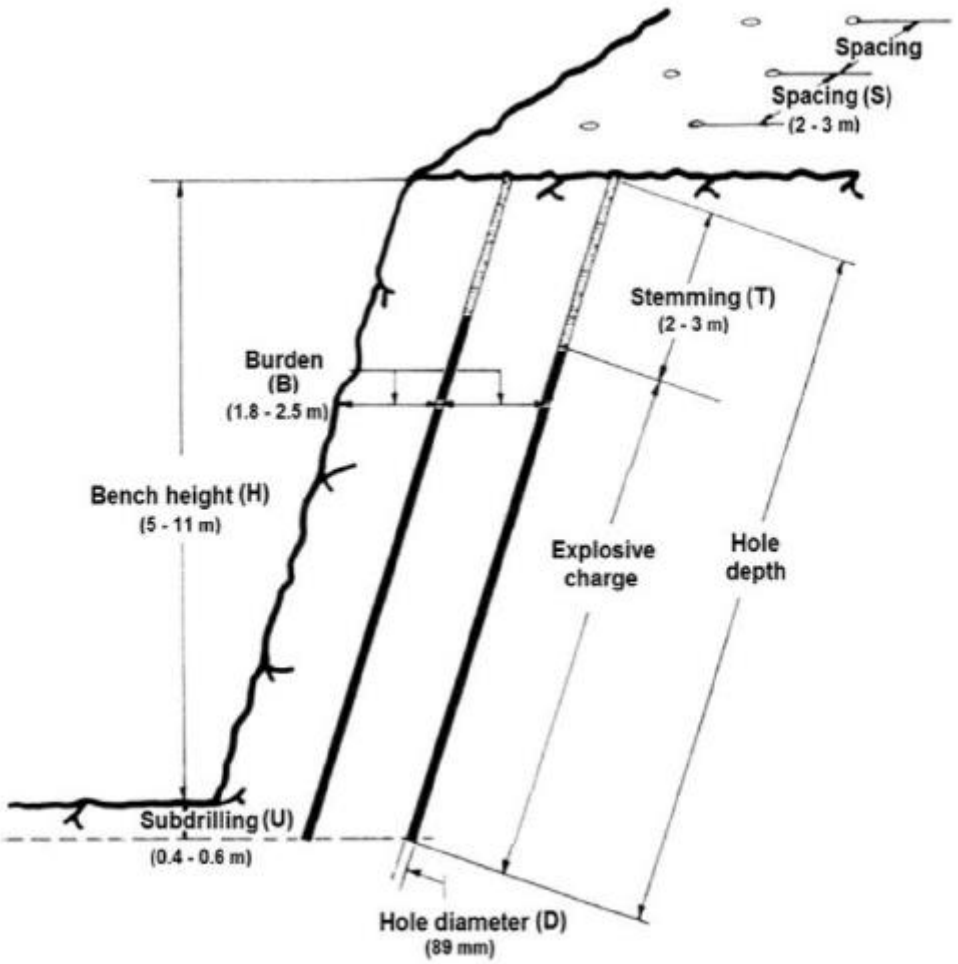


Figure 15.5: Blast Design Parameters[168]

With this regard, k constant was assumed as average value of 27[169]. the hole length is varying 3-6 meter (4.5 metes on average). The stemming height (SH) is around 2 meters. The burden (B) was assumed as 2 meters to be able to calculate the facerbust impact. The hole diamater is 89 mm. According to Ministry of Environment, Urbanizations and Climate Change's Blasting Designs and Blasting Environmental Impacts Guide, 2018; the explosive charge mass per meter (m) is 5 kg/m ANFO for holes with 89 mm[170]. Finally the blast-hole angle (θ) was assumed as 45° to determine the maximum throw distance. Accordingly, the maximum fly rock fistances can be calculated as described in Table 15.5.

Table 15.5: Maximum Throw Distances (m) for Key Mechanisms

Mechanism	Formula	Maximum Throw Distance (m)
Face burst	$L_{max} = \frac{27^2}{9.8}\left(\frac{\sqrt{5}}{2}\right)^{2.6}$	99.42 meters~100 meters

[168] Shirazi, Amin & Mohebbi, Javad & Tabatabaee, Hamid. (2015). ADAPTIVE-NEURO FUZZY INFERENCE SYSTEM (ANFIS) MODEL FOR PREDICTION OF BLAST-INDUCED GROUND VIBRATION a b c. SCIENCE INTERNATIONAL. 27. 2079-2091.

[169] https://www.superpit.com.au/wp-content/uploads/2015/05/Terrock-Golden-Pike-Flyrock-Modelling-Report.pdf

[170] Ministry of Environment, Urbanizations and Climate Change's Blasting Designs and Blasting Environmental Impacts Guide, 2018

Mechanism	Formula	Maximum Throw Distance (m)
Cratering	$L_{max} = \frac{27^2}{9.8}\left(\frac{\sqrt{5}}{2}\right)^{2.6}$	99.42 meters~100 meters
Rifling	$L_{max} = \frac{27^2}{9.8}\left(\frac{\sqrt{5}}{2}\right)^{2.6} \sin 90$	99.42 meters~100 meters

The safe radius is obtained using the farthest fly rock data from the blasting data. The safe distance can be described as twice the distance found the farthest fly rock distance from the explosion[171].

Maximum number of explosives to be used is 222 as described in Table 15.3. The distance between each hole will be 4 meters. With this regard, the blasting will take place in a area with around 2,500 m^2 and 3,000 m^2. With this regard, the Area of Influence for blasting activities identified according to safe distance calculation is presented in Figure 15.6.

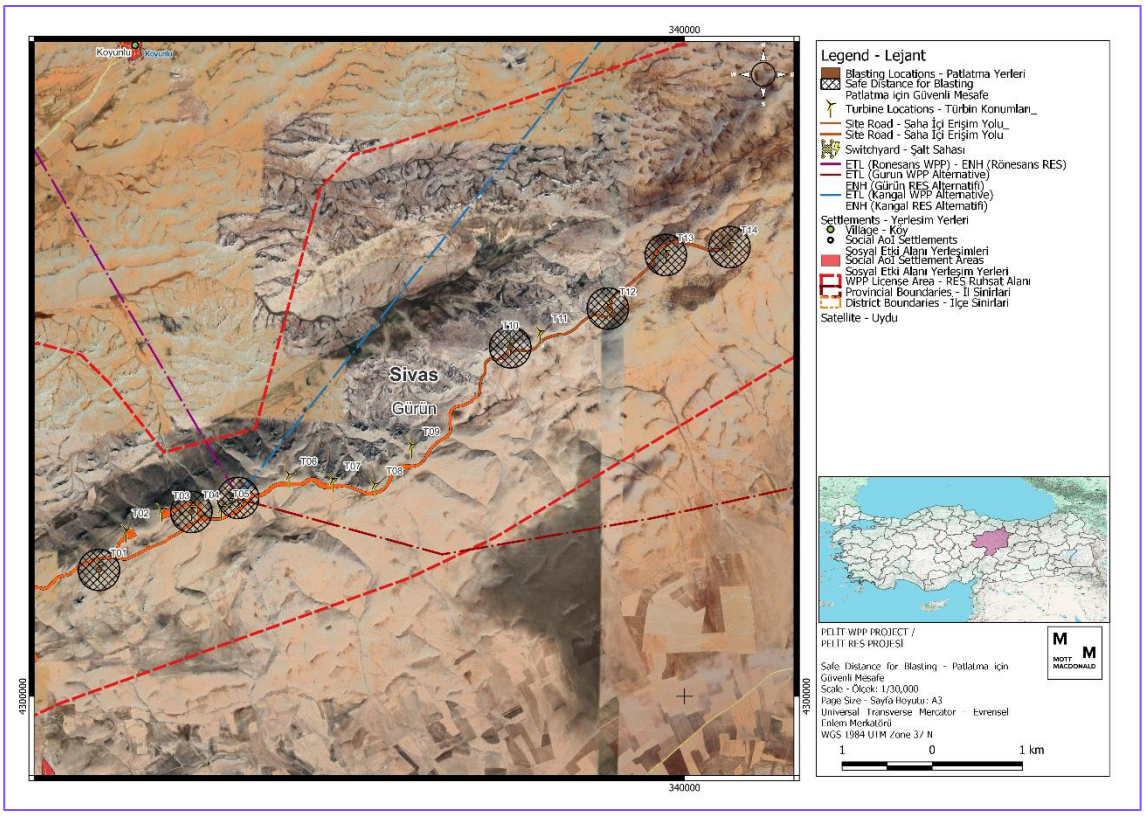


Figure 15.6: Safe Distances for Blasting

As it can be seen from Figure 15.6, no structures or roads are located inside or near the AoI. Thus, it can be said that, no significant impact is foreseen with regard to blasting activities.

15.4.1.10 Ecosystem Services

The Project's direct impacts on priority ecosystem services may result in adverse health and safety risks and impacts to local community members. Ecosystem services can be described as

[171]. Richards A B and Moore A J 2005 Flyrock control-by chance or design Proceedings of 30th ISEE conference on explosives and blasting technique, New Orleans 3 pp 6-8

the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organized into four types:

- Provisioning services, which are the products people obtain from ecosystems.
- Regulating services, which are the benefits people obtain from the regulation of ecosystem processes;
- Cultural services, which are the nonmaterial benefits people obtain from ecosystems; and
- Supporting services, which are the natural processes that maintain the other services.

Within the scope of the Project, it is expected to use water sources to be supplied from local authorities and there is a risk to have an impact on livestock and agricultural activities. Thus, the local authorities relevant to the ecosystem services can be determined as below:

- Kayseri Regional Directorate of Forestry
- Sivas Governorship Provincial Directorate of Food, Agriculture and Livestock
- Ministry of Agriculture and Forestry
- Gürün Municipality Water and Sewerage Directorate

Within the scope of the assessment of ecosystem services, the official correspondences conducted within the scope of National EIA studies which were provided to consultant was reviewed as well. With this regard, the roles of each ecosystem service and their opinion on the Project is given in table provided below.

Table 15.6: Description of each Ecosystem Service and their opinion on the Project

Ecosystem Service in question	The job description of the Authority	Content
Kayseri Regional Directorate of Forestry	To conduct research on crop and animal production, aquaculture, and agricultural policies; to protect forests, combat desertification, and develop policies for nature protection; to manages national parks, nature parks, and conservation areas; to study water resource protection and sustainable use and to coordinate national water management.	According to the Regional Directorate of Foretsry, As a result of the examinations made within the scope of the EIA regulation and the Forestry Law No. 6831, the realization of the Project will not have any negative impacts on forests and forestry activities.
Sivas Governorship Provincial Directorate of Food, Agriculture and Livestock	To implement and support good agricultural and organic agricultural practices, agricultural and animal husbandry Projects, to inspect and follow up on plant and animal diseases, to ensure animal breeding and control, To carry out permitting and inspection services of food production facilities, to establish and supervise farmer organizations, to provide training and support in agriculture and animal husbandry, to carry out land arrangement and consolidation practices.	After determining the finalized area information in the Project area, if there are areas to be evaluated within the scope of our legislation, it is necessary to apply with the necessary documents and prepare the survey report before the works are started. Regarding the agricultural lands within the Project in question, according to the provisions of the Soil Conservation and Land Use Law No. 5403, the provisions of the Pasture Law No. 4342 for the areas specified as pasture in the official records, according to the provisions of the Agricultural Reform Law No. 3083 on Land Arrangement in Irrigation Areas in the consolidation areas, and according to the provisions of the Water Products Law No. 1308 for the activities to be carried out in the water resources within the field, work should be carried out after obtaining the necessary permits and these issues should be stated in the EIA report.
Gürün Municipality Water and Sewerage Directorate	To provide clean and safe drinking water to all residences, businesses and public buildings in the city, To maintain sewerage systems and ensure safe treatment of wastewater, To carry out regular maintenance and repair of water and sewerage infrastructure, To regularly test water sources and distribution systems and maintain water quality, To respond quickly to emergencies occurring in water and sewerage systems, To carry out billing procedures for water and sewerage services and resolve customer complaints.	The vacuum truck fee of the domestic wastewater accumulated in the sealed septic tanks to be established in the Project area must be paid in advance and a contract must be made in advance.
General Directorate of Forestry, Department of Fighting Forest Fires	To conduct research on crop and animal production, aquaculture, and agricultural policies; to protect forests, combat desertification, and develop policies for nature protection; to manages national parks, nature parks, and conservation areas; to study water resource protection and sustainable use and coordinates national water management.	The Project shall be complied with the following conditions to get the approved correspondence from the department, • In case there is a forest fighting department building near the Project area, then the necessary equipment, electricity and the power supply should be provided to the department in order to support firefighting processes. • CCTV equipment of the plant shall also be utilized by the firefighting department for the spotting forest fires and their causes. • There should be warning sign on the wind turbines. • If general directorate of forest necessitate meteorological data, the plant operators should be providing the data

15.4.1.11 Public Access

Construction activities may limit public access to certain areas, impacting the daily lives of local residents. Restrictions on traditional access routes and public spaces could lead to disruptions in community activities and potential conflicts. It shall be noted that the Project footprint is not located on any route which is often used by residents of nearby settlements. Nevertheless, it shall be noted that due to construction activities some routes may be affected temporarily for livestock activities. Clear communication and community engagement are vital to mitigating potential tensions and addressing the concerns of residents affected by restricted access. Thus, Mukhtars of the villages located within the Social AoI will be engaged and relevant information will be given.

It shall be noted that, as the locations of the wind turbines and switchyard are on the areas where limited built area in question. However, animal husbandry activities are performed near the locations of the wind turbines and switchyard construction areas. Therefore, public access risk is foreseen.

15.4.1.12 Security Personnel

The deployment of security personnel during the construction phase raises considerations regarding community safety. While their presence is essential for safeguarding the Project area potential impacts may arise concerning the interaction between security personnel and the local community. Mismanagement or perceived threats could lead to tensions, affecting community well-being. Striking a balance between ensuring project security and maintaining positive community relations is crucial to minimizing potential negative impacts associated with the presence and actions of security personnel. Security personnel will be employed from licensed companies and only competent and trained staff will be employed.

15.4.2 Operation

15.4.2.1 Blade and Ice Throw

During the operation phase of a wind power plant, one of the potential risks to community health and safety is associated with blade throw incidents. The rotating blades of wind turbines, often spanning considerable lengths, pose a potential hazard if a malfunction or extreme weather conditions lead to the detachment of a blade. The force generated by a rotating blade can result in the throwing of debris over a significant distance, posing a risk to both on-site personnel and nearby communities. Blade throw incidents may occur due to factors such as material fatigue, manufacturing defects, or adverse weather conditions. The potential for thrown debris requires careful consideration and risk mitigation measures to safeguard the well-being of those in proximity to the wind turbines.

Moreover, in colder climates, the operation of wind turbines introduces an additional risk in the form of ice throw. As the turbine blades rotate, they may accumulate ice during freezing conditions. Subsequent dislodgment of this ice, either through natural thawing or other factors, can result in the release of ice fragments. These fragments can be thrown considerable distances, posing a risk to individuals, structures, and vehicles in the vicinity. The unpredictable nature of ice throw incidents necessitates comprehensive risk assessments and mitigation strategies to minimize potential harm. Awareness of local weather conditions and the implementation of de-icing technologies become crucial components of addressing the ice throw risk during the operational phase of a wind power plant.

Throwing distances are calculated using with hub height and rotor diameter for each wind turbine. Throwing distances at which ice can fall or be thrown from turbine varies between 300m

– 400m. As a result of the calculations made for each turbine, the highest throwing distance was accepted as the critical distance.

Considering these distances; impact zone that assumed a circular area from the turbine centres, was examined. Accordingly, the throw distance will be assessed according to the formulation described below.

Critical Throw distance: $B = 1.5\ x\ (H + L)$

B: Distance,

H: Tower Height (m) and,

L: Wing Length (m).

As it is described in *Chapter 2: Project Description*, the maximum (H) Tower Height is 105m and (L) Wing Length is 163m. Thus, (B) Distance is calculated as follows:

$$B = 1.50\ x\ (105\ m + 163m\ ) = 402m$$

The number of receivers likely to be affected are presented in below Table 15.7 and Table 15.8.

Table 15.7: Calculation summary for ice throw

Critical Distance (m)	Total Number of Receivers within Critical Distance (m)
402	0

Table 15.8: Impact assessment for ice throw

Turbine No	Hub Height (m)	Rotor Diameter (m)	Throwing Distance, (m)	Number of Building in Throwing Distance	Assessment
1	105	163	402	0	No Impact
2	105	163	402	0	No Impact
3	105	163	402	0	No Impact
4	105	163	402	0	No Impact
5	105	163	402	0	No Impact
6	105	163	402	0	No Impact
7	105	163	402	0	No Impact
8	105	163	402	0	No Impact
9	105	163	402	0	No Impact
10	105	163	402	0	No Impact
11	105	163	402	0	No Impact
12	105	163	402	0	No Impact
13	105	163	402	0	No Impact
14	105	163	402	0	No Impact

Ice throwing distances are calculated with supplied design parameters and found out to be 402m. As a result of the calculations, investigations were carried out in a circular area with a radius of 402m, the centre point of which is the foundation of the wind turbine. The below figure shows there are no structures within the ice throw distance, which makes the impact magnitude minor and receptor sensitivity negligible. Hence, the overall impact significance can be considered as negligible.

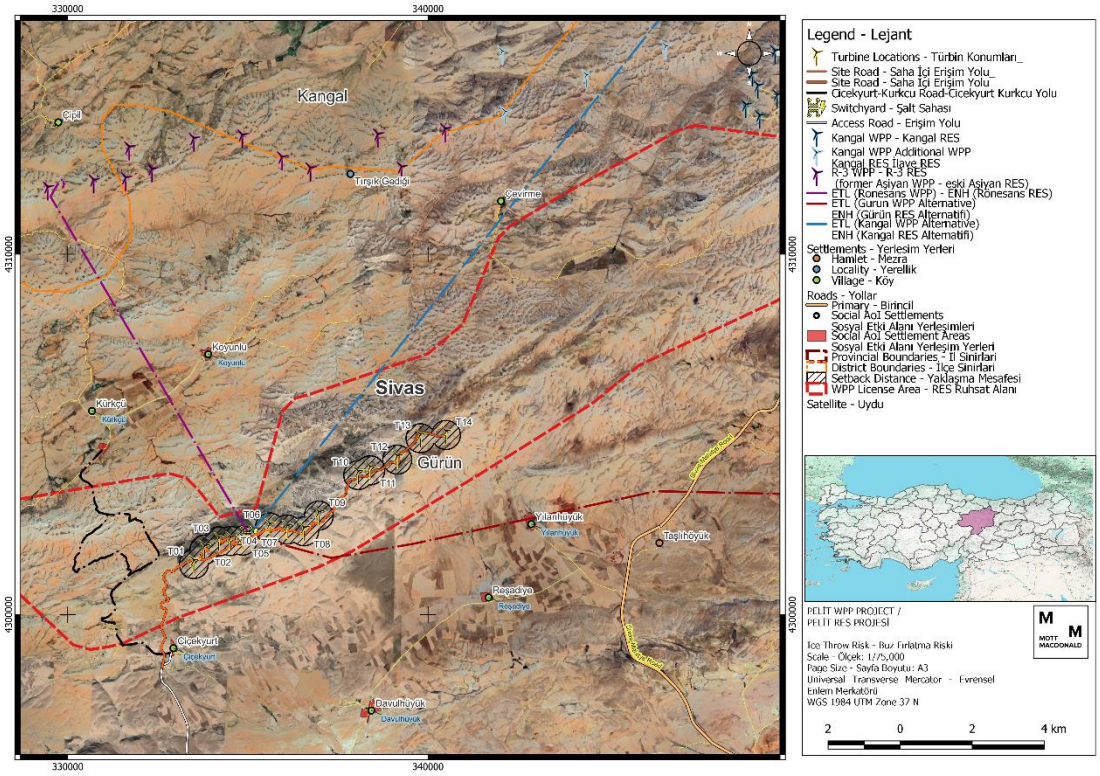


Figure 15.7: Ice Throw Risk Zones

In addition to ice throw risk, wind turbines are known to carry a risk known as "blade throw," in which a blade separates from the rotor and is propelled far off. Even though the blade throw risk can be considered extremely low according to IFC's EHS Guidelines for Wind Energy[172]; this could endanger both the general safety of wind farms and the residents close by. Blade failures in wind turbines can be caused by mechanical stress, exposure to harsh weather, and high-speed rotation. Thus, in this regard, blade throw risk was assessed as well. Table 15.9 shows that, the blade throw risk can occur in different scenarios, and it may have different probabilities.

Table 15.9: Frequencies of occurrence of scenarios relevant for risk analysis. The recommended values correspond to the 95% upper limits[173]

Scenario	Expected value [1/yr]	Recommended value [1/yr]
Loss of entire blade	$6.3 \cdot 10^{-4}$	$8.4 \cdot 10^{-4}$
Loss at rated speed		4.2×10^{-4}
Loss at 1.25*rated speed		4.2×10^{-4}
Loss at 2*rated speed		5.0×10^{-6}
Loss of blade tip	$1.2 \cdot 10^{-4}$	2.6×10^{-4}
Collapse of entire turbine at tower foot	$2.0 \cdot 10^{-4}$	3.2×10^{-4}
Collapse of rotor and/or nacelle	$5.8 \cdot 10^{-5}$	1.3×10^{-4}
Falling down of small parts from nacelle and hub	$1.2 \cdot 10^{-3}$	1.7×10^{-3}

[172] Environmental, Health, And Safety Guidelines For Wind Energy, IFC, 2015

[173] Guidelines on The Environmental Risk of Wind Turbines In The Netherlands, H. Braam, L.W.M.M. Rademakers, ECN Wind Energy. 2004

To be able to assess the throw distance during average and maximum wind speed occurrences, loss of blade tip scenario was considered so that it can be possible to assess the worst case scenario (As smaller portion of the blade is expected to be thrown further due to its small volume and mass). With this regard, probability of loss of blade tip is assumed as $2.6x10^{-4}$ (the recommended value in Table 15.9. Throw distances are calculates as follows:

1. Set-back Distance

Set-back distance $X = 1.5\ x\ (H + L)$

H: Tower Height (m) and,

L: Wing Length (m).

$$B = 1.50\ x\ (105\ m + 163m\ ) = 402m$$

2. Average Distance

A simple projectile motion is assumed to calculate the throw distances. For the throw distance of a blade, a ruptured piece of a blade is taken into consideration. For this event, wind speed and the following forces are taken into account:

a) Centrifugal Force by the blade rotation at its average rotational speed; 10.8 rpm (technical datasheet)
b) Drag Force by the air resistance towards the object.
c) Projectile Kinetic Motion which is drifted by the wind (It is assumed that the wind speed has the drifting effect on the X-axis).
d) Moreover, the wind is assumed to have an x-axis force and a 45°-degree throw effect

$$V_y \times t - \frac{t^2}{2}(g + \frac{\rho CA}{2m} \times V_y \times V) = Y$$

As described in *Chapter 2: Project Description*, according to the official wind measurement data specific to the Project area, it has been reported that the annual average wind speed of the Project Area is approximately 7-8.5 m/s. The maximum observed wind speed in Sivas is 41.2 m/s which was observed on 22 May 2008 according to the General Directorate of Meteorology[174].

$Y = -105m$ the hub height is the maximum Y distance assuming that the wind tower is in a flat surface.

$$w\ = \frac{2 \times \pi \times rpm}{60} rad/sec$$

Given that the radius of the blade is 69m,

$$w = \frac{2 \times \pi \times 10.5}{60}\ rad/sec$$

$$w\ = 1.1\ rad/sec$$

$$V_{blade}\ = \sqrt{(w^2 \times r^2)}$$

$$V_{blade}\ = \sqrt{(1.1^2 \times 81.5)}$$

$$V_{blade}\ = 89.57m/sec$$

[174] Meteoroloji Genel Müdürlüğü (mgm.gov.tr)

$V_{blade,x} = V_{blade} \times \cos\alpha$

Where α is rotor axis angle which is 7°°. Hence,

$V_{blade,x} = 89.57 m/sec \times \cos 5$

$V_{blade,x} = 25.41\ m/sec$

As described in *Chapter 2: Project Description*, according to the official wind measurement data specific to the Project area, it has been reported that the annual average wind speed of the Project area is approximately 7-8.5 m/s. The maximum observed wind speed in Sivas is 41.2 m/s which was observed on 22 May 2008 according to the General Directorate of Meteorology[175].

$V_x = V_{blade,x} + V_{wind}.$

Assuming that the wind has an x-axis force. Hence,

For the average wind speed,

$V_x = 25.41 + 7 = 32.41\ m/sec.$

Assuming a 45° throw with the wind

$V_x = V \times \cos 45 = 32.41\ m/sec$

$V = 61.69\ m/sec$

$V_y = V \times \sin 45 = 52.49\ m/sec$

Given that,

Parameters	Value
G (M/S²)	9.80
C (Drag Coefficient)	0.02
P (Air) (kg/m³)	1.20
Mass of Ruptured Piece (Assumed) (kg)	1.00
Density of the Blade (Assuming Carbon Fibre) (kg/m³)	2000.00
Thickness (m) (Assumed)	0.01
Volume (m³) (Calculated)	0.00
Area (m²) (Calculated)	0.05

And,

$$V_y \times t - \frac{t^2}{2}(g + \frac{\rho CA}{2m} \times V_y \times V) = Y$$

$$\frac{52.49m}{sec} \times t - \frac{t^2}{2} \times \left(\frac{9.8m}{sec^2} + \frac{\frac{1.2kg}{m^3} \times 0.02 \times 0.05m^2}{2x1\ kg} \times \frac{52.49m}{sec} \times \frac{61.69\ m}{sec}\right) = -105m$$

[175] Meteoroloji Genel Müdürlüğü (mgm.gov.tr)

$$52.49t - 5.87\frac{m}{sec^2} \times t^2 = -105m$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = t$$

$$t = 10.62;\ -1.68$$

Hence,

$t = 10.62$ and,

$$X = V_x \times t$$

$$X = 32.41x10.62$$

$$X = 344.28\ m$$

3. *Maximum Distance*

For the maximum distance of a blade throw incident, a ruptured blade is taken into consideration. For this event, maximum wind speed and the following forces are taken into account:

a) Centrifugal Force by the blade rotation at its average rotational speed; 10.5 rpm (technical datasheet)
b) Drag Force by the air resistance towards the object.
c) Projectile Kinetic Motion which is drifted by the wind (It is assumed that the wind speed has the drifting effect on the X-axis)

For the maximum wind speed,

$$V_x = 25.41 + 41.2 = 66.61\ m/sec.$$

Assuming a 45° throw with the wind

$$V_x = V\ \times \cos 45 = 66.61\ m/sec$$

$$V = 126.79\ m/sec$$

$$V_y = V\ \times \sin 45 = 107.89\ m/sec$$

Given that,

Parameter	Value
g (m/s²)	9.80
C (drag coefficient)	0.02
ρ(air)(kg/m³)	1.20
mass of ruptured piece (assumed)(kg)	1.00
density of the blade (assuming carbon fibre) (kg/m³)	2000.00
thickness(m) (assumed)	0.01
volume (m³) (calculated)	0.00
area(m²) (calculated)	0.05

and,

$$V_y \times t - \frac{t^2}{2}(g + \frac{\rho CA}{2m} \times V_y \times V) = Y$$

$$\frac{107.89m}{sec} \times t - \frac{t^2}{2} \times \left(\frac{9.8m}{sec^2} + \frac{\frac{1.2kg}{m^3} \times 0.02 \times 0.05m^2}{2x1\ kg} \times \frac{107.89m}{sec} \times \frac{126.79\ m}{sec} \right) = -105m$$

$$107.89t - 9.0\frac{m}{sec^2} \times t^2 = -105m$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = t$$

$$t = 12.89;\ -0.9$$

Hence,

$t = 12.89$ and,

$X = V_x \times t$

$X = 66.61x12.89$

$X = 858.39m$

To assess the risks regarding blade throw, according to Guidelines on The Environmental Risk of Wind Turbines In The Netherlands, H. Braam, L.W.M.M. Rademakers, ECN Wind Energy. 2004, there are ten main categories of receptors to be considered, which are Houses and buildings, (ii) Roads, (iii) Waterways, (iv) Railways, (v) Industrial areas, (vi) Underground pipelines, (vii) Overhead pipelines, (viii) High tension lines, (ix) Dikes and dams, (x) Paths for communication rays. Accordingly:

Table 15.10: Status of the Receptors regarding Blade Throw Risk

Receptor	Status
Houses and buildings	There are no structures in the setback zone There are no structures located in the Risk Zone (avg. wind speed) There are no structures located in the Risk Zone (max. wind speed)
Roads	There are no state roads. There are only some sections of non-stabilised roads
Waterways	There are no wet creeks or waterways
Railways	There are no railways
Industrial areas	There are no industrial pipelines
Underground pipelines	There are no Underground pipelines
Overhead pipelines	There are no Overhead pipelines
High tension lines	There are no High tension lines
Dikes and dams	There are no Dikes and dams
Paths for communication rays	There are no Paths for communication rays

*These identified structures do not necessarily mean that these are residential areas etc as these were identified via google earth satellite images. The status of these structures will be determined during construction (whether they are houses, barns, summer houses etc.) by CLOs of Borusan and owner of these structures will be informed about construction and operation activities and associated impacts.

Thus, only receptors which are in question are the structures and the non-stabilised roads.

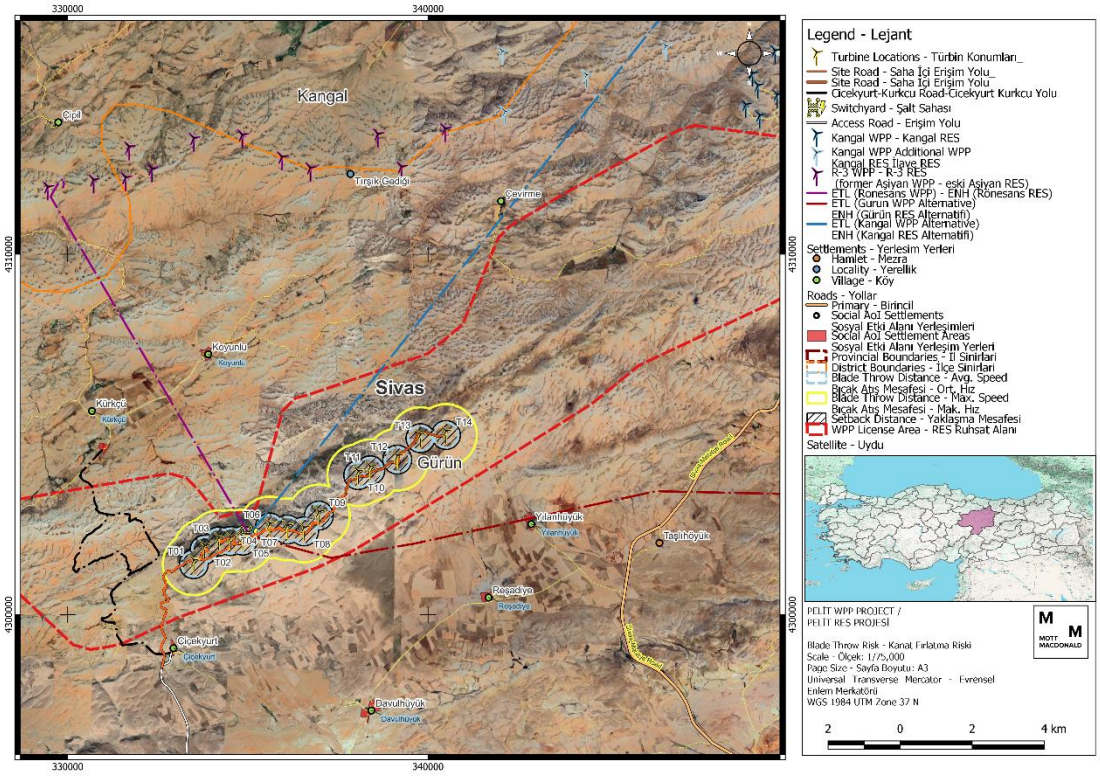


Figure 15.8: Blade Throw Risk Zones

Thus, it can be assumed that, even during more extreme weather conditions resulting in higher wind speed, the maximum throw distance can be expected to be low. In addition, as stated in Table 15.9, the probability of a blade throw risk is significantly small. As described before, the recommended expected value to observe a loss of a blade tip once a year is 2.6×10^{-4}. This means that probability of this impact is significantly low which results in low magnitude of blade throw impact.

Moreover, the receptor sensitivity of the blade throw can be assumed to be negligible as there are no structures[176] within the throw distances. Thus, impact significance is foreseen as negligible. Hence no physical displacement is in question as no significant blade throw risk is in place.

15.4.2.2 Aviation

The operation phase of a wind power plant introduces unique challenges and potential risks related to aviation safety. One of the primary concerns revolves around the proximity of wind turbines to established flight paths or airfields. The towering height of wind turbines and their rotating blades can pose a hazard to low-flying aircraft, including small planes and helicopters. Pilots navigating these areas face the risk of collision with turbine blades or turbulence generated by the wind farm. This underscores the importance of robust communication and coordination between wind farm operators and aviation authorities to delineate clear no-fly zones and implement safety measures that minimize the risk of aviation-related incidents.

[176] These identified structures do not necessarily mean that these are residential areas etc as these were identified via google earth satellite images. The status of these structures will be determined during construction (whether they are houses, barns, summer houses etc.) by CLOs of Borusan and owner of these structures will be informed about construction and operation activities and associated impacts.

Closest airport is Sivas Airport which approximately 100 km and Kayseri Airport which approximately 130 km away from the WPP License Area (Figure 15.9).

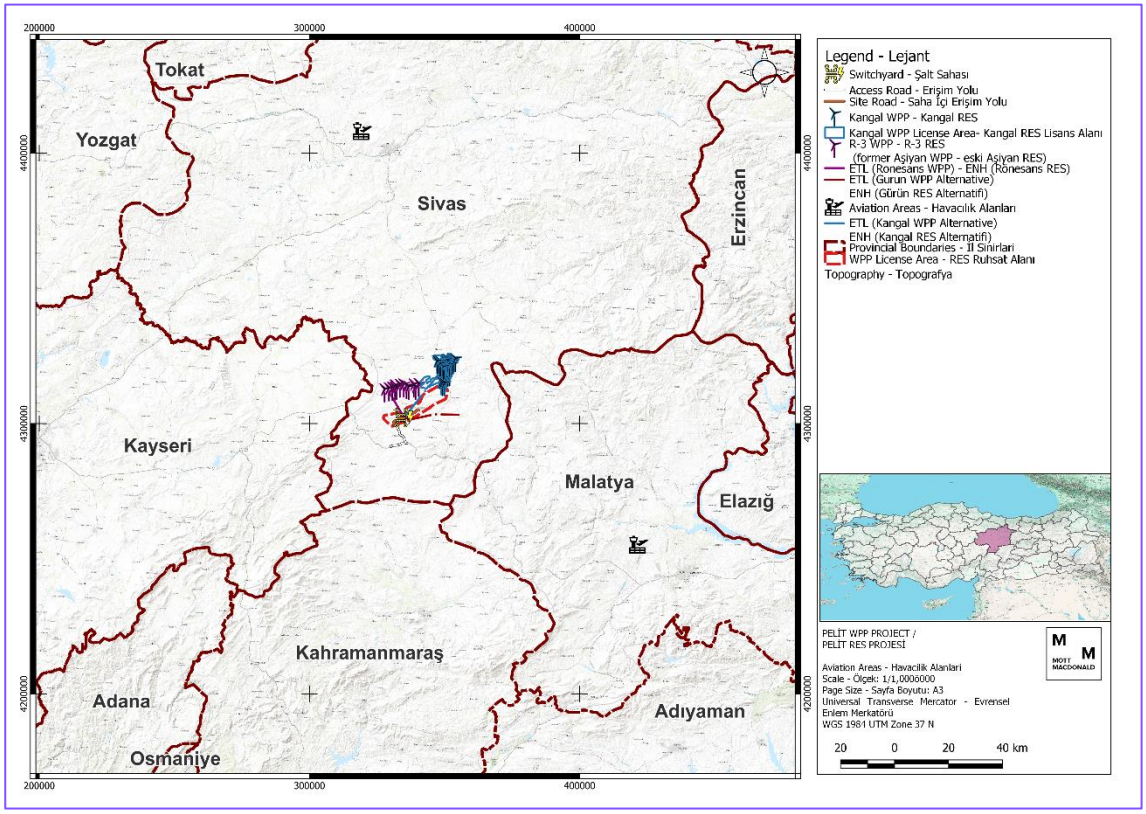


Figure 15.9: Nearest aviation areas

In general, impacts of wind turbines on areas related with aviation can be summarised as below:

- ***Radar Interference:*** Wind turbines can cause radar interference, where their rotating blades appear as “clutter” on radar screens. This interference can sometimes be mistaken for aircraft, potentially affecting air traffic control and navigation systems[177].
- ***Turbulence:*** Wind farms generate turbulence due to the movement of their blades. This turbulence can affect nearby aircraft during take-off, landing, or low-altitude flight. Pilots need to be aware of these conditions when operating near wind farms.
- ***Visual Impact:*** The sheer size and number of wind turbines can alter the visual landscape for pilots. This impact may not directly affect safety but can be a consideration for aviation stakeholders (See *Chapter 10: Landscape and Visual* for more detailed assessment).
- ***Obstruction and Height Hazards:*** If placed too close to aerodromes or flight routes, wind turbines can become physical obstacles that pose hazards to low-flying aircraft[178].

As it can be understood by the foreseeable impacts of the wind turbines on aviation, the severity of the impact is related with the design (hub height and rotor diameter) and site selection. The severity of this impact can be assessed according to the **International Civil Aviation Federal Aviation Administration (FAA)’s** established guidelines to ensure aviation safety.

[177] Aviation and wind farms: working together for a safer future (airport-technology.com)

[178] https://www.airsight.de/projects/item/wind-energy-and-aviation/

- ***FAA Guidelines (70/7460-1L)***

The FAA assesses structures proposed to be built or altered at **200 feet (≈60 meters) above ground level (AGL) or higher** or near an airport. The height threshold for identifying an obstruction has been identified as **499 feet (≈152 meters)** AGL. Within this scope, the adequacy of the wind turbines with regard to aviation security needs to be assessed.

The lighting recommendations are specified for **wind turbines** at various heights, considering the unique characteristics of wind turbine farms. Accordingly:

- Horizontal detection coverage should provide for obstruction lighting to be activated and illuminated prior to aircraft penetrating the perimeter of the volume, which is a minimum **5.5 km** away from the obstruction or the perimeter of a group of obstructions. Considering the fact that the helipad in question is **100 km away from the nearest turbine**, the lighting can be considered as proper conditions.
- Vertical detection coverage should provide for obstruction lighting to be activated and illuminated prior to aircraft penetrating the volume, which extends from the ground up to 304 m above the highest part of the obstruction or group of obstructions, for all areas within the 5.5 km perimeter.

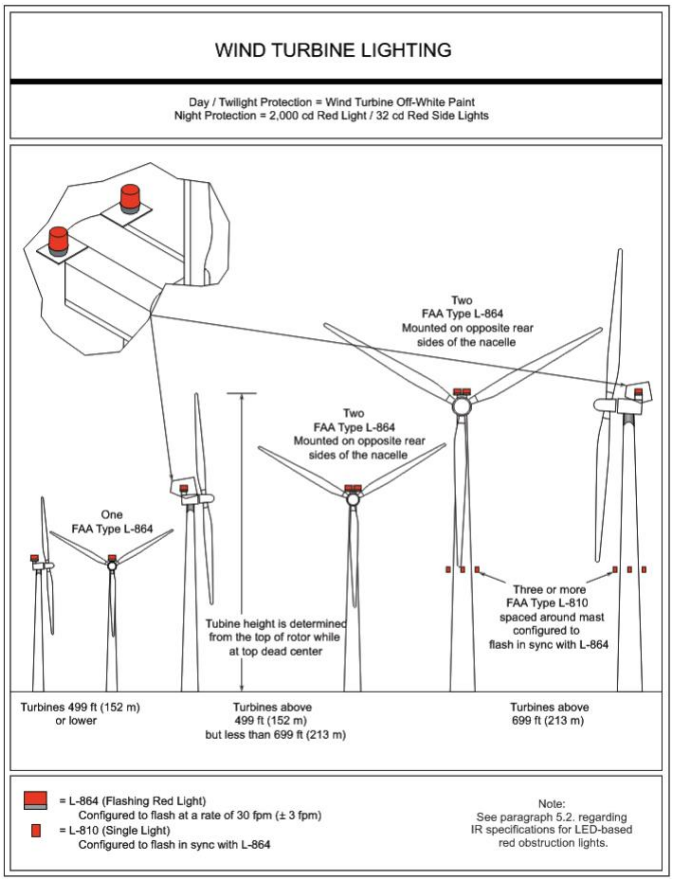


Figure 15.10: Wind Turbine Lighting Standards

15.4.2.3 Electromagnetic Interference and Radiation

The operation of a wind power plant introduces potential risks related to Electromagnetic Interference (EMI), particularly concerning the electricity transmission infrastructure. The vast network of electrical cables, transformers, and other components within the wind power system can emit electromagnetic fields. These fields have the potential to interfere with nearby electronic equipment, communication systems, and sensitive instruments. The risk of EMI is especially pertinent in areas where critical infrastructure, such as hospitals or telecommunication facilities, coexists with the wind power plant. Effective mitigation strategies involve implementing shielding measures for sensitive equipment, maintaining appropriate distances between power lines and electronic devices, and adhering to established electromagnetic compatibility standards. By addressing the potential for EMI, wind power operators can ensure the uninterrupted functioning of essential electronic systems in the vicinity of the plant.

The generation and transmission of electrical power within a wind power plant may also give rise to concerns related to Electromagnetic Radiation (EMR). The movement of electricity through cables and components can produce electromagnetic fields, and at certain frequencies, these fields may emit radiation. While wind turbines typically emit low-frequency EMR, the cumulative impact of multiple turbines and associated infrastructure warrants careful consideration. Potential health risks associated with prolonged exposure to electromagnetic radiation, as well as impacts on electronic equipment, must be thoroughly examined. Mitigation measures may include maintaining safe distances between residential areas and power lines, implementing screening techniques, and adhering to regulatory guidelines regarding permissible levels of electromagnetic radiation.

The possible impacts of EMI and EMR was also assessed within the scope of the national EIA studies. Accordingly, electromagnetic radiations include various types such as radio waves, microwaves, infrared rays, visible light, ultraviolet rays, x-rays, gamma rays, and cosmic rays, depending on their wavelengths, frequencies, and energies. The main types of radiation are categorized into two groups: **ionizing radiation** and **non-ionizing radiation**.

Ionizing radiation directly or indirectly ionizes atoms in the environment by transferring its energy while passing through matter. Non-ionizing radiation, such as radio waves, microwaves, infrared light, ultraviolet light, and visible light, are not ionizing due to their lack of sufficient energy. Non-ionizing radiation from sources such as fixed telecommunication devices, radio and television transmitters, electric transmission lines, transformer stations, and electric household appliances (microwave ovens, electric shavers, hair dryers, etc.) is categorized as electromagnetic radiation that is non-ionizing.

Despite the presence of both electric and magnetic fields around electric appliances and energy transmission and distribution lines, recent research has focused on the potential health impacts of magnetic fields.

The impacts of low-frequency (0 Hz-10 kHz) electromagnetic radiation on human health: Low-frequency fields cause superficial impacts on the human body, such as hair being raised. Restrictions are imposed to minimize exposure to harmful impacts of electromagnetic radiation.

The impacts of high-frequency (10 kHz-300 GHz) electromagnetic radiation on human health: The human body is sensitive to high-frequency fields, and the energy absorbed by the body is converted into heat. High-frequency fields generate heat throughout the body or in specific areas. Standards have been developed to limit the electromagnetic radiation to specific values to reduce harmful impacts. When electromagnetic radiation reaches a living organism, it is absorbed by that organism.

Specific Absorption Rate (SAR): The rate at which electromagnetic energy is absorbed by body tissues (W/kg). For a one-degree temperature increase in the human body, 4 W of energy must be absorbed per kilogram of tissue. ***A SAR limit of 0.08 W/kg has been accepted for general living areas of humans***.

Easily measurable and/or observable parameters are used to determine limit values. These parameters include **electric field intensity, magnetic field intensity**, and **power density**.

Electromagnetic Fields and Bio-interaction: The main sources of extremely low-frequency (ELF) fields are high-voltage power lines, building electrical installations, transformers, and electrical devices such as hair dryers and washing machines used in homes. It is important to distinguish between which ELF sources are specifically magnetic field sources and which are specifically electric field sources when measuring electromagnetic fields. While magnetic fields are formed due to the passage of electric current, electric fields are formed by the accumulation of electric charges (this accumulation is expressed with electrical potential difference). Most devices used in homes are magnetic field sources, while power grids are primarily electric field sources, but they also become magnetic field sources due to the influx of current.

The electric and magnetic fields occurring in houses have a frequency of 50 Hz and a wavelength of 6000 km. Near to ELF fields, the human body can disrupt electric fields but not magnetic fields. However, both fields create different electric field and current inductions in different regions of the body. Therefore, the electromagnetic impact of wind turbines is not significant. Research has shown that electromagnetic interference affects TV and radio broadcasts, aviation, and maritime communications negatively. However, it has been observed that many frequencies are not affected as long as radio and television antennas are not near the turbines.

The electromagnetic interference impact of turbines varies depending on the size and material of the blades. The noise and electromagnetic interference rate are high in turbines using metal materials. This problem has been significantly mitigated by using polyester-based materials. When ELF fields are sufficiently intense, electric fields and currents induced in tissues of the human body can cause impacts such as nerve and muscle stimulation and numbness in hands. No impacts are observed from surrounding electric and magnetic fields if they are very low. Non-ionizing EM fields emitted by electric power systems and electrical devices can cause adverse health impacts depending on their intensity and exposure duration. Therefore, to protect people from non-ionizing radiation, countries prepare regulations to protect the public from involuntary exposure to EMR and the potential adverse impacts that may arise.

National and international EMR exposure limits play an important role in controlling risks for individuals and avoiding situations that could be harmful to human health. Commonly accepted and applied limit values exist in many countries around the world, including European Union countries and the United States, determined by an international commission known as *International Commission on Non-Ionizing Radiation Protection (ICNIRP*). These limit values vary depending on the frequency of the emitted electromagnetic radiation.

A research carried out by TEİAŞ and TÜBİTAK under 154 Kv electric power transmission lines the magnetic field is found to be between 9-14 mG and the electric field is observed to be between 300-1000 V/m. In the measurements, both electric field and magnetic field It was observed that the effect decreases as you move away from the source. This result shows that the EMI and EMR to be occurred due to the existence of ETLs are below the public and occupational exposure limits determined by WHO as seen in Table 15.11.

Table 15.11: ETLs and Magnetic Field Information

Type of facility	Electric field (Kv/m)	Magnetic field (mG)
154 Kv Electricity Transition L–ne	0.3 - 1	9-14
154 Kv transfer station	0.1-2	30-140
Public exposure limits determined by WHO[179]	5	1000
Occupational exposure limits determined by WHO[180]	10	5000

Studies on electromagnetic fields over the last 40 years have proven that there are no health effects. However, this is not a definite effect of electromagnetic fields. Does not mean that it does not exist.

All in all, within the social AoI, which encompasses Sivas Province; Gürün District; Kürkçü, Koyunlu, Böğrüdelik, Yılanhöyük, Yenibektaşlı, Çiçekyurt, Kayalar, and Konakpınar Villages, there will be no significant impact to the electromagnetic environment surrounding the Pelit Wind Power Plant (WPP) turbines while they are operating. Moreover, during the transfer of the produced energy from standard heights to the Collection Center via transportation lines, it is much below the limits accepted by the World Health Organization (WHO) and the ICNIRP, an international standard-preparing organization, and by our country. It is envisaged that it will remain and therefore the natural electromagnetic environment will be protected. With this regard, it can be said that the foreseen EMI and EMR impact of the Project can be considered as negligible.

15.4.2.4 Traffic Safety

The impact on traffic safety during the operation phase is intimately tied to the daily lives of local residents. The continuous movement of maintenance vehicles can lead to altered traffic patterns and potential conflicts on local roads. The community's experience of these changes is influenced by factors such as the frequency of vehicle movements, the adequacy of road infrastructure, and the awareness of local residents.

Nevertheless, no significant frequency of vehicle movement for operation and maintenance activities are expected; thus, additional traffic load to be created by the Project can be considered as negligible.

In addition, the operation of wind turbines introduces a unique aspect of traffic safety concerns related to the motion of the turbine blades. The expansive size and rotating nature of these blades can create a distinctive visual element that may draw the attention of drivers passing by wind farms. This distraction impact is particularly relevant on roads in close proximity to wind farms, where drivers may be navigating the visual and dynamic presence of the turbines.

It is necessary to comply with the minimum distances that WPPs must have to the highway boundary line as specified in the Internal Circular of the General Directorate of Highways on WPPs dated 04 July 2014 and numbered 223836. Accordingly, the compliance to the existing traffic system will be assessed according to the formulation described below.

Highways: $B = 1.5\ x\ (H + L)$

State and Provincial Roads: $B = 1.25\ x\ (H + L)$ where;

[179] Radiation: Electromagnetic fields (who.int)

[180] Radiation: Electromagnetic fields (who.int)

B: Distance,

H: Tower Height (m) and,

L: Wing Length (m).

As it is described in *Chapter 2: Project Description*, (H) Tower Height is 105 m and (L) Wing Length is 163 m. As mentioned in Section 15.3.3, nearest roads are state roads. Thus, (B) Distance is calculated as follows:

$$\boldsymbol{B = 1.25\ x\ (105 + 163\ m) = 335\ m}$$

As it can be seen from Figure 15.11, locations of the wind turbine comply with the provisions of Internal Circular of the General Directorate of Highways on WPPs dated 04 July 2014 and numbered 223836. As it can be seen from Figure 15.11, nearest road is Kayseri-Malatya Road and Çiçekyurt Village Road which are 8 km and 2.7 km, respectively close to the nearest turbine.

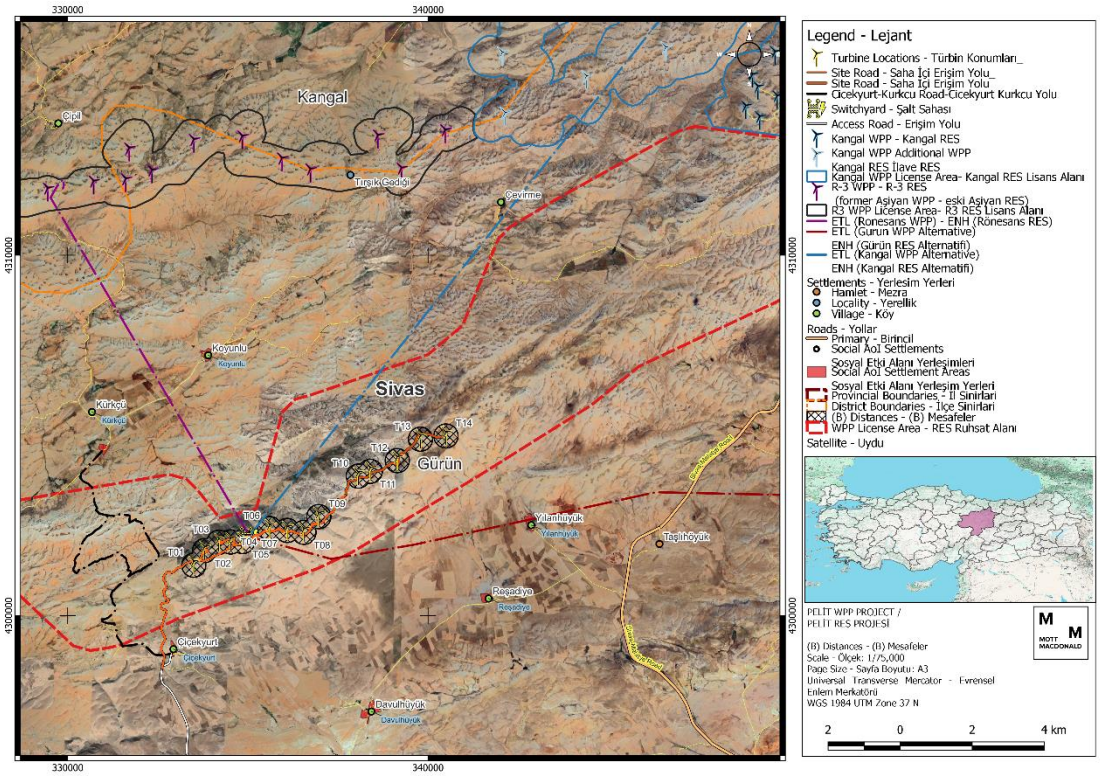


Figure 15.11: (B) Distances

It also shall be noted that only Project vehicles will use the designated access roads. This will minimize the impact on the additional traffic load and its adverse impacts. In addition, within the scope of security management issues, only Project vehicles and vehicles with necessary permit to be obtained from the HSE teams of the site will be allowed to enter Project area. In addition, HSE Teams will make sure necessary signs are in place for speed limits. In addition, ad-hoc audits on the access roads will take place to make sure the relevant traffic management mitigation measures are being complied by the staff.

15.4.2.5 Shadow Flicker

During the operation of a wind power plant, one of the visual impacts that can affect nearby residents is shadow flicker. Shadow flicker occurs when the rotating blades of a wind turbine cast shadows that intermittently pass over nearby structures or residences as the sun changes position. The repetitive nature of this flickering effect, particularly during sunrise and sunset, has the potential to cause visual discomfort and annoyance for those living in the proximity of the wind turbines. The duration and frequency of shadow flicker depend on factors such as the turbine's rotor size, blade length, and the distance between the turbines and nearby structures. Managing the impact of shadow flicker involves conducting thorough assessments to predict its occurrence, establishing setback distances that minimize its impact on inhabited areas, and employing technological solutions such as automatic shadow flicker controls that adjust the turbine's operation to reduce the occurrence of flicker during sensitive times. The detailed assessment regarding Shadow Flicker is presented in *Chapter 10: Landscape and Visual*. Within the scope of this assessment no impact has been identified. On any permanent residence within the defined AoI.

15.4.2.6 Public Access

Construction activities may limit public access to certain areas, impacting the daily lives of local residents. Restrictions on traditional access routes and public spaces could lead to disruptions in community activities and potential conflicts. Nevertheless, it shall be noted that due to construction activities some routes may be affected temporarily for agriculture and animal husbandry activities. Clear communication and community engagement are vital to mitigating potential tensions and addressing the concerns of residents affected by restricted access. Thus, Mukhtars of the villages located within the Social AoI will be engaged and relevant information will be given.

It shall be noted that, as the locations of the wind turbines and switchyard are on the areas where limited built area in question. The main sources of income of the villages are based on agriculture and animal husbandry. Residents perform forest grazing for animal husbandry. Hence, since the animal husbandry activities are performed near the locations of the wind turbines and switchyard construction areas public access risk is foreseen.

15.4.2.7 Security Personnel

The presence of security personnel during the operation phase of a wind power project is essential for safeguarding the Project area and ensuring its continued functionality. Security personnel play a crucial role in deterring trespassing, theft, or vandalism, thereby protecting the integrity of the wind farm. Security personnel at a wind power plant play a crucial role in ensuring community health and safety for several reasons:

- Wind power plants often have restricted access areas and critical infrastructure that need protection from unauthorized access. Security personnel are responsible for monitoring and controlling access to these areas to prevent trespassing, vandalism, theft, and potential sabotage, which could endanger the local community.
- In the event of emergencies such as fires, accidents, or natural disasters, security personnel are often the first responders on-site. Their training in emergency protocols and procedures enables them to act swiftly to mitigate risks and coordinate with local emergency services to ensure a rapid and effective response, thus safeguarding the surrounding community.
- Security personnel will serve as a visible presence within the wind power plant premises, promoting awareness of safety protocols and regulations among visitors, employees, and contractors. Their presence reinforces the importance of adhering to safety guidelines, such

as wearing PPE and following designated pathways, which helps prevent accidents and injuries that could impact the local community.

- Security personnel will be trained to de-escalate conflicts and resolve disputes effectively. By maintaining order and resolving conflicts peacefully, they contribute to a safer environment within the wind power plant and its vicinity, reducing the likelihood of incidents that could escalate and pose risks to the community.

However, the impact of security personnel on the local community is an important consideration. Their interactions with residents will be managed carefully to avoid tensions or negative perceptions. The presence of security personnel at a wind power plant can potentially affect in various ways:

Companies typically face challenging circumstances with limited guidance on how to respect their human rights obligations. The Voluntary Principles help businesses understand their working environment, identify security-related human rights concerns, and take decisive action to solve them. Ineffective security management has a significant influence on community rights, as well as serious implications for the company's social licence to operate. The human rights-compliant security measures specified in the Security and Human Rights Toolkit shall be implemented without exception. As a result, it will serve as a standard for evaluating a company's progress towards establishing human rights-compliant security measures. On a more practical level, security managers and field people will benefit from the best practices to assist them in solving specific difficulties during construction and operation phase of the Project[181].

- The visible presence of security personnel may be interpreted by some members of the local community as a form of surveillance or control, leading to feelings of mistrust or resentment. This perception can exacerbate existing social tensions and fuel resentment towards the wind power plant and its operators.
- In situations where tensions between the wind power plant operators and the local community are already high, the presence of security personnel may escalate conflicts. Interactions between security personnel and community members, particularly if perceived as confrontational or heavy-handed, can escalate tensions and lead to confrontations or protests.
- Security measures such as fencing, restricted access areas, and surveillance cameras can create a perception of exclusion among some members of the local community. They may feel marginalized or excluded from decision-making processes regarding the wind power plant's operation and development, leading to feelings of alienation and frustration.
- The presence of security personnel can reinforce power dynamics between the wind power plant operators and the local community. Community members may perceive security measures as a demonstration of the operators' authority and control over the local area, further intensifying feelings of powerlessness and disenfranchisement.
- Conversely, security personnel trained in conflict resolution techniques can play a positive role in de-escalating tensions and resolving conflicts between the wind power plant operators and the local community. By effectively communicating with community members, addressing concerns, and facilitating dialogue, security personnel can help foster understanding and cooperation, mitigating the risk of social conflicts.

According providing competent and well-trained security personnel is essential to avoid any kind of social conflict during the operation phase of the Project. Overall, while security personnel are essential for maintaining safety and protecting critical infrastructure, their presence can also impact social conflicts within the local community. Effective communication, community engagement, and conflict resolution skills are crucial for security personnel to navigate these

[181] Addressing Security and Human Rights Challenges in Complex Environments (voluntaryprinciples.org)

challenges and contribute to positive relationships between the wind power plant and the local community.

15.4.2.8 Noise

During the operation phase, the turbines will produce noise from their mechanical and electrical components, as well as from the aerodynamic effects of the blades. Students, whose schools and/or houses are close to the turbines, may be affected from the noise during the operation phase. However, there are no receptors identified in terms of this impact and the sensitivity of the receptors regarding this impact is low and the magnitude is minor. The significance level of the impact is assessed as minor. No significant land users located in vicinity to the Project which will be subject to noise impacts.

15.4.3 Summary

Within the scope of Impact Assessment studies, sensitivities of the receptors were identified according to the matrix described below.

Table 15.12: Community health and safety sensitivity/value criteria for resource/ receptors

Subject	High	Medium	Low	Negligible
Local community members to be affected from Community Health and Safety related concerns, / nearby settlements	Local community members are located near the Project Area where can easily, inside WPP License Area	Local community members are located near the Project Area where can easily, close to WPP License Area	Local community members are identified away from WPP License Area (>10 km)	No local community member is identified nearby
Water Quality and Availability / Groundwater bodies	Project Area is located within groundwater protection zone	Groundwater is being used as major water source by local communities	Limited groundwater is available, city network for water supply is available	No groundwater source is available, groundwater table is too high
Structural Safety of Project Infrastructure	Soils of Degree 4: Very severe erosion risk	Soils of Degree 3: Severe erosion risk	Soils of Degree 2: Moderate erosion risk	Soils of Degree 1: None or very low level of erosion risk
Life and Fire Safety	The area subject to fire is protected zone such as national park etc.	The area subject to fire is forest area.	There is limited area to be subject to a fire	There is no area to be subject to a fire
Traffic Safety & Load Transportation	Main traffic route is located within residential areas where pedestrian safety is in consideration	Main traffic route is located within settlements which is used by daily commute	Main traffic route is located on state roads where heavy vehicles can be present	Main traffic route is located on motorways
Community safety / Ice Throw	There are intense residential areas within the setback distance B=1.5 x (H+L), Motorways are in question	There are settlements within the setback distance B=1.5 x (H+L), State roads are in question	There are few, scattered structures within the setback distance B=1.5 x (H+L) Only stabilised roads available	There are no settlements within the setback distance. B=1.5 x (H+L) No road available
Community safety / Blade Throw	There are intense residential areas within the setback distance B=1.5 x (H+L),	There are structures within the setback distance B=1.5 x (H+L)/settlement in average throw distance,	There are few, scattered structures within the average velocity throw distance.	There are either no or few settlements within the maximum velocity throw distance. No road available

Subject	High	Medium	Low	Negligible
	Motorways are in question	State roads are in question	Only stabilised roads available	
Aviation	There is an aviation area <1 km	There is an aviation area <5 km	There is an aviation area <20 km	There is an aviation area <50 km
Explosive Use and Blasting	There are intense residential areas within the safe distance zone, Motorways are in question	There are settlements within the safe distance zone, State roads are in question	There are few, scattered structures within the safe distance zone Only stabilised roads available	There are no settlements within the safe distance zone No road available
Ecosystem Services	Ecosystem services are local community members' major livelihood.	Local community members are benefiting from essential ecosystem services	Limited access to ecosystem service is in question	No ecosystem service is in question

As described before, local community members were identified near WPP License Area nearby the villages around thus, sensitivity of the local community members were identified as medium. Also, it was determined that nearby local community members are using groundwater as a water source the groundwater bodies was also determined as medium as well. As described in *Chapter 6: Land Use, Soil and Geology*, there are areas with severe erosion risk within the WPP License Area where the structural safety of the Project infrastructure sensitivity is high. WPP License Area has sections of forest areas this makes sensitivity of Life and Fire Safety related receptors medium. Furthermore, the main access to the Project Area will be done via Çiçekyurt Village Road and Kayseri Malatya Road thus the relevant sensitivity is low. Finally, it is known that public has access to ecosystem services, and they are benefiting from water, forestry etc. thus, the relevant sensitivity was determined as medium.

Table 15.13: Impact significance during construction

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Water quality and availability	Groundwater bodies	Low	Construction	AoI	Reversible	Unlikely	Minor	Medium	Minor
Air Quality	Local community members / nearby settlements	Low to High	Construction	AoI	Reversible	Possible	Minor	Low to High	Minor
Noise	Local community members / nearby settlements	Medium	Construction	AoI	Reversible	Possible	Minor to Major	Medium	Minor to Major
Structural safety of Project Infrastructure	Project area / Components	Medium	Construction	AoI	Reversible	Possible	Moderate	High	Major
Life and Fire Safety	Forest Area	Medium	Construction	AoI	Reversible	Possible	Moderate	Low	Minor
Traffic Safety	Passengers on Kayseri-Malatya Road	High	Construction	AoI	Irreversible in case of fatal accident	Occurring regularly under typical conditions	Moderate	Low	Minor
	Student	Medium	Construction	Access road and highways	Irreversible in case of fatal accident	Occurring regularly under typical conditions	Minor	Low	Negligible

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Abnormal Load Transportation	Passengers on Kayseri-Malatya Road	Low	Construction / Tower transportation	AoI	Irreversible in case of fatal accident	Occurring regularly under typical conditions	Minor	Low	Negligible
Transport and Storage of Hazardous Material	Local community members / nearby settlements	Low	Construction	AoI	Reversible	Unlikely	Minor	Medium	Minor
Disease Prevention	Local community members / nearby settlements	Low	Construction	AoI	Reversible	Possible	Minor	Medium	Minor
Emergency Preparedness and Response	Local community members / nearby settlements	Medium	Construction	AoI	Reversible	Possible	Moderate	Low	Minor
Explosive Use and Blasting	Local community members / nearby settlements / nearby roads	Low	Construction / Land Preparation	AoI	Reversible	Occurring regularly under typical conditions	Major	Negligible	Minor
Ecosystem Services	Local community members benefiting from ecosystem services	Low	Construction	AoI	Reversible	Occurring regularly under typical conditions	Minor	Medium	Minor
Public Access	Local community members / nearby settlements	Low	Construction	AoI	Reversible	Possible	Minor	Medium	Minor

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Security Personnel	Local community members / nearby settlements	Low	Construction	AoI	Reversible	Occurring regularly under typical conditions	Minor	Medium	Minor

Table 15.14: Impact significance during operation

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
Ice Throw	Local community members / nearby settlements and roads	Major	One time	Setback Distance	Irreversible	Unlikely	Minor	Negligible	Negligible
Blade Throw	Local community members / nearby settlements and roads	Major	One time	Avg. and Throw Distance	Irreversible	Unlikely	Minor	Negligible	Negligible
		Major	One time	Max. Throw Distance	Irreversible	Unlikely	Minor	Negligible	Negligible
Aviation	Sivas Airport	Low	Operation	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
Electromagnetic Interference and Radiation	Local community members / nearby settlements	Low	Operation	AoI	Reversible	Possible	Minor	Medium	Minor
Traffic Safety	Local community members / nearby settlements	Low	Operation	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
Shadow Flicker	Local community members / nearby settlements	Low	Operation	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
Public Access	Local community	Low	Operation	AoI	Reversible	Unlikely	Negligible	Medium	Negligible

Impact Description	Receptor	Impact Magnitude					Overall Impact Magnitude	Receptor Sensitivity	Impact Significance
		Severity	Duration	Spatial Extent	Reversibility	Likelihood			
	members / nearby settlements								
Security Personnel	Local community members / nearby settlements	Low	Operation	AoI	Reversible	Unlikely	Negligible	Medium	Negligible
Noise	Local community members / Students	Medium	Operation	AoI	Reversible	Possible	Minor	Medium	Minor

15.5 Impact Mitigation & Residual Impact

15.5.1 Construction

During the construction phase of a wind power plant, proactive measures are essential to mitigate potential impacts on various aspects of community health and safety. The proposed mitigation measures are listed below.

15.5.1.1 Water, Noise and Air Quality

Mitigation measures regarding water, noise and air quality management are provided *Chapter 5: Water Quality, Hydrology and Hydrogeology, Chapter 7: Air Quality,* and *Chapter 9: Noise and Vibration* in detail respectively.

15.5.1.2 Structural Safety of Project Infrastructure

Mitigation measures regarding erosion and natural hazard management which are described in *Chapter 6: Land Use, Soil and Geology* will be complied with.

15.5.1.3 Life and Fire Safety (L&FS)

Mitigating life and fire safety risks involves the implementation of strict safety protocols, including fire prevention measures, emergency evacuation plans, and the provision of adequate firefighting equipment. Regular safety drills and training sessions for construction personnel contribute to a prepared and responsive environment, ensuring the well-being of workers and preventing fire incidents. Furthermore, the Emergency Response Plan, which will include the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures. In addition, local community shall be aware of the life and fires safety related risks to be triggered by the Project and regular consultation shall be carried out with local people.

15.5.1.4 Traffic Safety

Ensuring traffic safety during construction requires the development of comprehensive traffic management plans. This includes clearly marked construction zones, strategically placed signage, and designated routes for heavy construction vehicles. Regular communication with local authorities, ongoing traffic monitoring, and collaboration with the community help minimize disruptions and maintain a safe traffic environment. Provisions of the Motorway Traffic Law (OG Date/Number: 18.07.1997/2918) will be complied with.

The Project-specific Traffic Management Plan will be established and implemented throughout the construction phase. The content of the Plan will define sensitive receptors, such as schools, on the access roads to the Project area. Relevant mitigation measures including regular consultations with school administration, awareness raising activities for children on road traffic safety, trainings to the drivers in terms of road safety, traffic regulations and speed limit will be identified in the Plan. The Plan will also specify the busy hours that are used by the students and try to avoid the utilization of trucks during these hours.

According to the Traffic Management Plan, best practices will be applied to prevent congestion and traffic accidents during peak and off-peak hours. The Project company will comply with national legislation and ensure proper security and regulation of construction-related traffic. Vehicles will enter and exit the site in a forward direction, with temporary direction signs at strategic locations. Pre-defined access routes will be used for long, wide, and heavy load vehicles transporting construction materials. Excavated material will be recycled and reused on the Project area, reducing vehicle movements, and avoiding earth-moving heavy equipment movements. Good site visibility will be ensured, and disruption to road users will be minimized by using the Project area for storage and providing on-site parking.

Special specialized vehicles will be used for oversized components transportation, and weight restrictions will be followed. Stakeholder consultation will be ongoing, and traffic movement surveys will be conducted to determine the scale of impact on transportation routes through sensitive areas.

Pedestrian safety is a high priority, with separate pedestrian walkway routes and safe passages provided. Traffic management staff will be available at locations where pedestrians are most likely to be present. Drivers will receive induction and regular updates to promote safety and awareness.

15.5.1.5 Abnormal Load Transportation

Mitigating the impact of abnormal load transportation involves meticulous route planning, obtaining necessary permits, and implementing safety measures during the transportation of oversized components. Utilizing specialized vehicles with proper signage, escort vehicles for guidance, and adherence to weight restrictions ensure the safe transport of large components, minimizing potential risks to both construction workers and the public. Engagement with local authorities regarding abnormal load transportation will be performed as well as part of the stakeholder engagement activities. Furthermore, the Traffic Management Plan, which includes the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures.

15.5.1.6 Transport and Storage of Hazardous Materials

Mitigation measures regarding soil quality management which are described in *Chapter 6: Land Use, Soil and Geology* will be complied with.

15.5.1.7 Disease Prevention

Implementing measures to prevent the spread of diseases during construction includes maintaining hygiene practices among construction workers, providing sanitation facilities, and adhering to health and safety guidelines. Regular health screenings, vaccinations, and awareness campaigns contribute to disease prevention within the construction site, safeguarding the well-being of both workers and nearby communities. Furthermore, Emergency Response Plan, which will include the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures. In addition, a code of conduct will be in place to identify the rules to avoid any disease spread risk.

15.5.1.8 Emergency Preparedness and Response

A robust emergency response plan is crucial during construction. This involves the establishment of emergency response teams, communication protocols, and evacuation procedures. Regular drills and scenario-based training sessions prepare construction personnel to respond effectively to unforeseen incidents, ensuring a swift and organized response to emergencies. An Emergency Response Plan (EPRP) will be prepared with necessary engagement of local relevant authorities which includes the key measures will be prepared and implemented for all stages of the Project. The EPRP will be shared with the relevant local authorities to increase their level of awareness of potential Project risks and mitigations. Furthermore, Emergency Response Plan, which will include the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures.

15.5.1.9 Explosive Use and Blasting

Conducting thorough geological surveys helps understand the rock formations and potential fault lines, allowing to design blasts that minimize vibrations and reduce unintended damage. Continuous monitoring of vibration levels during blasting ensures they remain within safe limits, protecting nearby structures and ecosystems. Additionally, implementing dust and noise control measures, such as water sprays and noise barriers, can significantly reduce the environmental and community disturbances caused by blasting.

After blasting, assessing the site for residual hazards like loose rocks or unstable ground is important. Rehabilitation after blsating can prevent future landslides or rockfalls, ensuring the safety of the surrounding area. Rehabilitating the site by replanting vegetation and restoring natural habitats helps mitigate ecological impacts and ensures the environment can recover sustainably.

15.5.1.10 Ecosystem Services

Mitigating impacts on ecosystem services requires careful planning to minimize disruption to natural processes. Although landscape management methods are not substantial because the Project mostly spans an pastureland region, they are considered to be involved. The measures involve implementing erosion control measures, habitat restoration programs, and sustainable construction practices. Regular environmental monitoring ensures that construction activities align with ecological conservation goals, preserving vital ecosystem services. Within this scope, continuous and regular engagement with relevant local authorities will be implemented.

15.5.1.11 Public Access

Mitigating impacts on public access during construction includes clear communication about access restrictions, providing alternative routes, and minimizing disruptions to community activities. Regular updates through community engagement programs foster understanding and cooperation, ensuring that construction-related limitations are conveyed transparently to the public. In addition, requirements specified in the Security Management Procedure will be complied with.

15.5.1.12 Security Personnel

Managing the presence of security personnel during construction involves establishing protocols for positive interactions with the local community, minimizing tensions. Effective communication channels, community liaison officers, and regular feedback mechanisms contribute to a positive relationship between security personnel and the community, fostering a safe and secure construction environment.

15.5.2 Operation

The operation phase of a wind power plant demands attention to community health and safety, necessitating a comprehensive approach to mitigate potential impacts.

15.5.2.1 Blade and Ice Throw

Mitigating the risks associated with blade and ice throw incidents involves the implementation of advanced technologies and operational controls. Utilizing sensors and monitoring systems enables real-time tracking of ice accumulation on turbine blades, allowing for timely intervention to prevent ice throw. Adjusting operational parameters during icy conditions and employing technologies like de-icing systems contribute to minimizing the risks associated with blade and ice throw incidents. Furthermore, the Emergency Response Plan, which will include the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures.

In addition, to mitigate blade throw risk, periodic inspections and maintenance of wind turbine blades will be carried out to detect potential issues such as cracks, material deterioration, or fatigue. By addressing these concerns proactively, the risk of blade failures can be significantly reduced.

Local people will be warned during cold weather and extreme windy days to inform about possible risks. Furthermore, warning signs will be placed nearby the turbines to state the risk of ice & blade throw.

15.5.2.2 Aviation

Addressing aviation-related risks requires close collaboration with aviation authorities. Implementing radar systems to detect incoming aircraft and establishing clear communication channels with air traffic control contribute to airspace safety. Placing warning lights and markings on wind turbines enhances visibility for pilots, reducing the risk of collisions. Ongoing engagement with aviation stakeholders ensures continuous adherence to safety protocols during the wind power plant's operation.

15.5.2.3 Electromagnetic Interference and Radiation

To mitigate electromagnetic interference and radiation risks, compliance involves employing electromagnetic shielding for sensitive equipment and maintaining safe distances between power lines and electronic devices. Implementing advanced monitoring systems allows for continuous assessment of electromagnetic fields, ensuring compliance with established safety standards and minimizing potential impacts on community health.

15.5.2.4 Traffic Safety

Effective traffic safety measures during the operation phase encompass the development of comprehensive traffic management plans. This involves coordinating with local authorities to establish safe routes for construction and maintenance vehicles, implementing clear signage, and conducting regular safety training for Project personnel. Collaboration with the community to establish communication channels regarding traffic patterns and potential disruptions further enhances overall traffic safety. Within the scope of the Project, the provisions of Motorway Traffic Law (OG Date/Number: 18.07.1997/2918) will be complied with. Furthermore, the Traffic Management Plan, which include the necessary protocol for responding to any occurrences, will be followed as part of the mitigating measures.

According to the Traffic Management Plan the Project will aim to implement lower speed limits and traffic control measures within the Project area. Route planning, speed limits, vehicle safety standards, transportation timing, and training requirements will also be implemented. Emergency Response Plans will be included in the Project's Emergency Response Plan. Traffic and transport plans will follow national and international guidelines. Emergency teams will be trained to respond to traffic-related emergencies. Information signs will be placed at entrances, lobbies, and plant locations for easy access. A safe working environment will be provided for drivers and transportation staff, and all vehicles will receive regular maintenance. Communication and collaborations with local authorities, NGOs, neighbouring facilities, and commercial organizations will be undertaken for traffic and transport management.

15.5.2.5 Shadow Flicker

The detailed mitigation measures regarding Shadow Flicker are presented in *Chapter 10: Landscape and Visual*. Within the scope of this assessment no significant impact was identified.

15.5.2.6 Public Access

Mitigating impacts on public access involves transparent communication and engagement with the community. Clearly defining access restrictions, providing advance notice of operation and maintenance activities and possible malfunctions contribute to minimizing disruptions. In addition, warning signs will be in place near the turbines to identify the risk of ice and blade throw as well. Regular updates and community outreach programs foster understanding and cooperation, ensuring that public access limitations are implemented with minimal inconvenience.

15.5.2.7 Security Personnel

To manage the presence of security personnel, measures include providing comprehensive training on community engagement, conflict resolution, and cultural sensitivity. Establishing protocols for positive interactions between security personnel and the local community minimizes tensions. Regular communication and feedback mechanisms enable continuous improvement in the management of security personnel, ensuring their role aligns with community well-being during the operation phase.

15.5.2.8 Noise

The detailed mitigation measures regarding Shadow Flicker are presented in *Chapter 9: Noise and Vibration*. Within the scope of this assessment no significant impact was identified.

15.5.3 Summary

A brief summary for the impact mitigation and residual impacts for construction and operation were briefly summarised in Table **15**.15 and Table 15.16 respectively.

Table 15**.15: Residual impact during construction**

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Water quality and availability	Groundwater bodies	Minor	Negligible
Air Quality	Local community members / nearby settlements	Minor	Negligible
Noise	Local community members / nearby settlements	Minor to Major	Negligible
Structural safety of Project Infrastructure	Project area / Components	Major	Minor
Life and Fire Safety	Forest Area	Minor	Negligible
Traffic Safety	Passengers on Kayseri-Malatya Road	Minor	Negligible
	Students	Negligible	Negligible
Abnormal Load Transportation	Passengers on Kayseri-Malatya Road	Negligible	Negligible
Transport and Storage of Hazardous Materials	Local community members / nearby settlements Groundwater bodies	Minor	Negligible
Disease Prevention	Local community members / nearby settlements	Minor	Negligible
Emergency Preparedness and Response	Local community members / nearby settlements	Minor	Minor
Explosive Use and Blasting	Local community members / nearby settlements	Minor	Negligible

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Ecosystem Services	Local community members benefiting from ecosystem services	Minor	Negligible
Public Access	Local community members / nearby settlements	Minor	Negligible
Security Personnel	Local community members / nearby settlements	Minor	Negligible

Table 15.16: Residual impact during operation

Impact	Receptor	Impact Significance without Mitigation	Residual Impact Significance
Ice Throw	Local community members / nearby settlements	Negligible	Negligible
Blade Throw	Local community members / nearby settlements and roads in max vel. throw range	Negligible	Negligible
	Local community members / nearby settlements and roads in avg vel. throw range	Negligible	Negligible
Aviation	Sivas Airpot	Negligible	Negligible
Electromagnetic Interference and Radiation	Local community members / nearby settlements	Minor	Negligible
Traffic Safety	Local community members / nearby settlements	Negligible	Negligible
Shadow Flicker	Local community members / nearby settlements	Negligible	Negligible
Public Access	Local community members / nearby settlements	Negligible	Negligible
Security Personnel	Local community members / nearby settlements	Negligible	Negligible
Noise	Local community members / Students	Minor	Negligible

16 Cultural Heritage

16.1 Introduction

This Chapter is to identify the tangible and intangible cultural heritage within the Cultural Heritage Impact Assessment (CHIA) border of the “Pelit Wind Power Plant Project” (Project) planned within Sivas (Gürün) Province and evaluate the possible effects of the Project activities on these assets.

This Chapter is written in line with the IFC PS8 Cultural Heritage and EBRD PR8 Cultural Heritage. In this section, the results of desktop studies and field research on tangible and intangible cultural heritage assets are evaluated.

16.1.1 Overview

The main objectives of the assessment are as follows:

- Determination of the current status and geographical distribution of the intangible and tangible cultural heritage assets that may be affected by the Project,
- Identifying the negative effects that may occur due to the Project on intangible and tangible cultural heritage,
- Determining the necessary methods and suggestions to minimize the negative effects on the intangible and tangible cultural heritage.

The cultural heritage study comprised a desk study of the data available for the study area and field surveys of the Project locations conducted by the senior archaeologists. The main objectives of the study are summarized below:

- Identifying the exact location and properties of registered and unregistered[182] cultural heritage sites and assets located within the cultural heritage study area (as specified below in Section 16.1.2) of the ESIA based on desk study and field surveys.
- Defining the adverse effects on the tangible and intangible cultural heritage assets which may occur as the result of project related activities (including all Project phases).
- Developing mitigation measures for the management of registered and unregistered cultural heritage within the study area, consistent with the requirements and procedures set by the Law on the Conservation of Cultural and Natural Property (No. 2863, 1983) and related secondary legislation as well as decisions of the related Regional Councils for the Conservation of Cultural Property for the registered sites or sites that are in the process of registration by the Ministry of Culture and Tourism (MoCT).
- Providing upfront information on the cultural heritage sites and assets located within Project’s impact area to the related cultural heritage authorities to ensure timely evaluation of the sites by the authorities within the framework of the Law on the Conservation of Cultural and Natural Property (No. 2863, 1983) and identify the management measures to be required by the authorities for those sites (e.g. measures to be taken by the Contractor prior to site entry).
- Providing upfront information on the cultural heritage sites and assets located within Project’s impact area to relevant Project departments to ensure timely planning and progress

[182] Unregistered sites may include: (i) sites in the process of registration by the related cultural heritage authorities, or sites with archaeological potential as identified/discovered by the cultural heritage team as part of the ESIA field surveys; or (ii) other sites including the remains of a historic bridge, a grave/graveyard, fountain, civilian architecture samples etc.

of the activities, in alignment with the evaluation and decision processes of the cultural heritage authorities.

- Contributing to the archaeological and cultural inventory of Türkiye by sharing the information on the cultural heritage sites and assets located within the ESIA study area (collected through scientific methods) with related Regional Councils for the Conservation of Cultural Property.

In consideration of the scope of work (design and construction responsibility) of the Contractor as defined in the Construction Contract, the scoping of the tangible and intangible cultural heritage studies, including the baseline, impact assessment and management, has been done as summarised in Table 16.1.

16.1.2 Study Area and Area of Influence

The study area of the cultural heritage impact assessment for tangible and intangible cultural heritage are as described in Table 16.1 and shown in Figure 16.1.

Table 16.1: CHIA Borders[183]

	Tangible Cultural Heritage	Intangible Cultural Heritage
Impact Assessment Boundaries	All Project Area (Project License Area, Site Roads, Switchyard, Turbine Locations and Energy Transmission Line)	Sivas/ Gürün - Çiçekyurt Village, Sivas/ Gürün - Yılanhöyük Village,

[183] The impact area for tangible cultural heritage was limited by the area where Project activities to be conducted. The boundaries for intangible cultural heritage were determined by taking into consideration settlements where cultural elements can be found around the Project area.

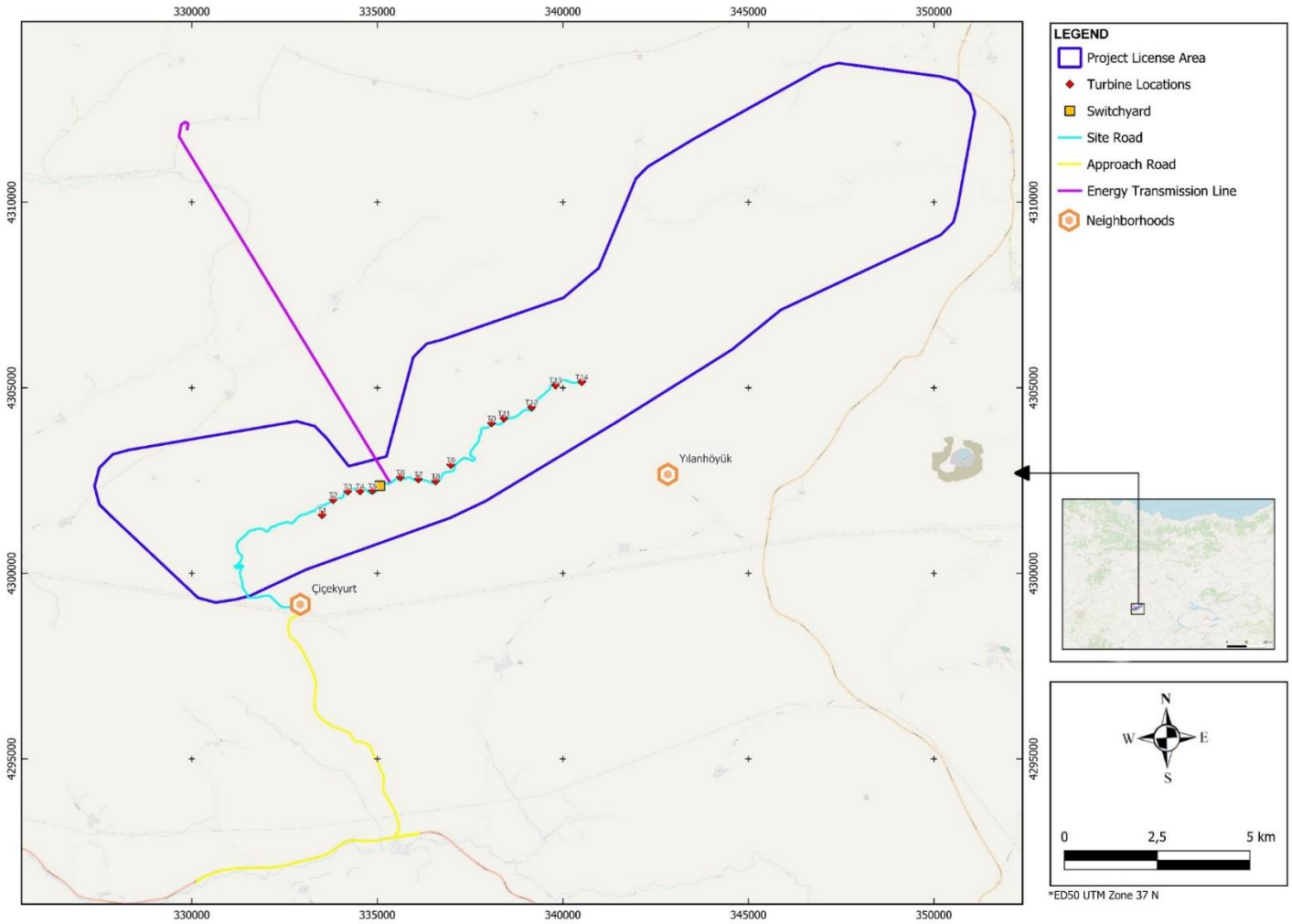


Figure 16.1: CHIA Study Area

16.2 National and International Requirements

16.2.1 National Requirements

16.2.1.1 National Requirements for Tangible Cultural Heritage

In Türkiye, the movable and immovable cultural and natural assets are under protection as dictated by the "Law on Preservation of Cultural and Natural Assets", 2863, which was published in the Official Gazette numbered 18113 and dated 23 July 1983. The cultural and natural heritage, which is protected by the aforementioned Law, is identified as:

- Natural properties which require protection and immovable assets which were built before the end of the 19th century.
- Any immovable cultural asset constructed after the end of the 19th century but categorized as "a significant asset which requires preservation" by the Ministry of Culture and Tourism.
- Immovable cultural assets located within the boundaries of Protection Sites; Structures, buildings or places that have witnessed significant historical events during the Turkish Independence War or the foundation of the Turkish Republic, regardless of their period and registration status; and all dwellings and buildings that have been used by Mustafa Kemal ATATURK without considering their period of construction or registration status.

The most relevant articles for the project impact assessment studies of the Law on Preservation of Cultural and Natural Assets (Law no:2863) are given in Table 16-2.

Table 16-2: Law on the Conservation of Cultural and Natural Property (Law No: 2863,1983)

Article	Explanation
Article 4 – Obligation to Notify	Persons that discover movable and immovable cultural and natural property, owners, proprietors or occupants that know or have recently found out about the existence of cultural and natural property on the land they own or use shall be obliged to notify the nearest museum directorship or the village headman or the local administrators of other places within at the **latest three days.** If such property is in military garrisons and restricted areas, the relevant command levels shall be notified in line with the relevant procedure. The village headman, the local administrator receiving such notification or the relevant authorities that are directly notified of such property shall take the necessary measures to protect and secure such property. The village headman shall notify the nearest local administrator as of the situation and the measures taken on the same day. The local administrator and other authorities shall notify in writing the MoCT and the nearest museum directorship **within ten days.** Upon receiving this notification, the Ministry and Museum Director shall instigate due proceedings as soon as possible in line with the provisions of this law.
Article 5 – Quality of State Property	Immovable property belonging to the state, public institutions and organizations and movable and immovable cultural and natural property to be protected that is known to exist or will be discovered on an immovable property owned by real and legal persons subject to civil law shall have the quality of state property. Registered and annexed foundation property subject to a separate status due to its special qualities shall not be covered by this provision.

Article 25 – Transfer to Museums	MoCT shall classify and register based on scientific principles movable cultural and natural property declared to the MoCT according to Article 4 and movable cultural and natural property to be protected as specified in Article 23. Antiquities that need to be conserved in state museums shall be duly transferred to museums. The criteria, procedures and principles for classification, registration and transfer to museums of movable cultural and natural property to be protected shall be specified in a regulation. The historical features of all kind of weapons and materials concerning Turkish military history shall be surveyed, examined and evaluated by the General Staff at the location they are found or are reported to be found. Antiquities excluded from the classification and registration and not needed to be placed in museums shall be returned with a document to their owners. The cultural property that has been returned with a document shall be at the discretion of their owner. Antiquities not taken back within one year by their owners can be kept at the museum or sold duly by the State.

In addition to Law no: 2863 on Preservation of Cultural and Natural Assets, there are some regulations and principal decisions governing the management of cultural and natural assets. According to the Principal Decision no: 658 taken on November 5th, 1999, on "Archaeological Sites, Conditions of Protection and Usage", the archaeological sites are classified into three main categories:

- **1st Degree Archaeological Sites:** Areas requiring highest level of protection, with the exception of scientific excavations aiming their protection. Neither construction nor development are allowed in these sites. All kinds of construction, excavation, and modification activities are prohibited within the boundaries of these sites. However, for exceptional cases such as the necessity for infrastructure construction, Regional Council for the Conservation of Cultural Property may permit such activities based on the approval of the relevant museum directorate and the head of the scientific excavation team.
- **2nd Degree Archaeological Sites:** Sites that require medium level of protection. They should be preserved based on the conditions of protection and utilisation set by the Regional Council for the Conservation of Cultural Property. Additional construction is prohibited. Similar to the 1st Degree Sites, for exceptional cases such as necessity for infrastructure construction among others, Regional Council for the Conservation of Cultural Property may permit such activities based on the approval of the relevant museum directorate and the head of the scientific excavation team.
- **3rd Degree Archaeological Sites:** Construction is permitted based on the decisions of Regional Council for the Conservation of Cultural Property. Before applying for a construction permit, test pit excavations should be conducted under the supervision of the local museum, and the outcomes of these excavations should be reviewed by the museum and, if present, the head of the scientific excavation team. Reviews should be submitted to Regional Council for the Conservation of Cultural Property. The Council may ask for extension of the scope of test pits before taking any decision.
- Furthermore, Implementation Guidelines for Field Surveys, Test Pits and Excavation Works on Cultural and Natural Assets (Ministry approval number 94949537-160.99-51264, dated 13.03.2013) define the procedures for salvage excavations, archaeological test pits and other studies.

16.2.1.2 National Requirements for Intangible Cultural Heritage

UNESCO put into effect the "Convention for the Safeguarding of the Intangible Cultural Heritage" in the 32nd General Conference held in Paris between September 29th and October 17th, 2003. The convention was officially accepted by the Republic of Türkiye with the "Law No. 5448 Regarding the Approval of the Convention of Safeguarding of Intangible Cultural Heritage

on January 19th, 2006". The intangible cultural heritage legally safeguarded by the relevant law was defined as follows:

- Cultural products and production processes such as oral narratives and oral traditions created by the folk in oral culture environments and included in folklore studies, performance arts, social practices, rituals and festivals, folklore, practices related to the universe and nature, handcraft traditions.

16.2.2 International Conventions and Guidelines

Türkiye has ratified the following key international conventions regarding the cultural heritage, which are applicable to the Project:

- United Nations Educational, Scientific, and Cultural Organisation (UNESCO), Convention on the Protection and Promotion of the Diversity of Cultural Expressions, Paris, 20 October 2005 (Türkiye made the ratification accession on 02 November 2017).
- UNESCO, Convention for the Safeguarding of the Intangible Cultural Heritage, Paris, 17 October 2003 (Türkiye made the ratification accession on 27 March 2006).
- UNESCO, Convention on the Protection of World Cultural and Natural Heritage, Paris, 16 November 1972 (Türkiye made the ratification accession on 16 March 1983).
- UNESCO, Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, Paris, 14 November 1970 (Türkiye made the ratification accession on 21 April 1981).
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, ICOMOS 2011

16.2.3 International Standards

16.2.3.1 International Finance Corporation (IFC)

In the field of Cultural Heritage, IFC Performance Standard 8[184] mentions the necessity of preserving cultural heritage for today and for the future. This Performance Standard aims to protect cultural heritage from the negative impacts that may arise from activities at every stage of the project and to ensure equal use of existing cultural heritage.

According to Performance Standard 8, "cultural heritage refers to (i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles".

16.2.3.2 European Bank for Reconstruction and Development (EBRD)

The EBRD specifies the implementation of PR 8 Cultural Heritage guidelines in order to understand the conservation and importance of cultural heritage[185]. The EBRD emphasizes that cultural heritage, both tangible and intangible, is important for economic and social development and is an integral part of the continuity of cultural identity and practices (including traditions, beliefs and/or languages).

[184] IFC PS8, January 2012.

[185] EBRD PR8, Cultural Heritage, Guidance Note, March 2023.

The PR8 requirement states that in case the project activities, the relevant laws and regulations and the obligations arising from the relevant international agreements affect any cultural heritage in the region and agreements approved by the project owner countries must be followed.

The main objectives of Performance Requirement 8 are as follows:

- support the protection and conservation of cultural heritage,
- adopt the mitigation hierarchy approach to protecting cultural heritage from adverse impacts arising from the project,
- promote the equitable sharing of benefits from the use of cultural heritage in business activities; and
- where significant elements of cultural heritage are identified, promote the awareness, appreciation and enhancement of cultural heritage as well as potential socioeconomic benefits for local communities.

According to the EBRD PR8, the term cultural heritage defines it as a resource group that does not belong to people (that is not their own property), and that is accepted as a reflection of their developing values, beliefs, knowledge, and traditions from the past to the present. It covers all tangible (physical) and intangible cultural heritage recognized locally, regionally, or nationally or in the international community.

Physical cultural heritage refers to mobile or immovable objects, sites, groups of buildings and associated cultural or sacred sites, and natural features and landscapes of archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.

16.2.3.3 Environmental Impact Assessment Directive (2014/52/EU) of the European Union, 2014

According to Article 16 of the Directive, for the protection and promotion of cultural heritage comprising urban historical sites and landscapes, which are an integral part of the cultural diversity that the Union is committed to respecting and promoting in accordance with Article 167(4) TFEU, the definitions and principles developed in relevant Council of Europe Conventions, in particular the European Convention for the Protection of the Archaeological Heritage of 6 May 1969, the Convention for the Protection of the Architectural Heritage of Europe of 3 October 1985, the European Landscape Convention of 20 October 2000, the Framework Convention on the Value of Cultural Heritage for Society of 27 October 2005 can be useful. In order to better preserve historical and cultural heritage and the landscape, it is important to address the visual impact of projects, namely the change in the appearance or view of the built or natural landscape and urban areas, in environmental impact assessments.

16.3 Methodology and Assessment Criteria

16.3.1 Methodology for Baseline Studies

Four phases have been undertaken in evaluating the present status of the tangible and intangible cultural heritage assets for Project. These phases are as follows:

- Desktop Studies Phase
- Field Research Phase
- Impact Assessment Phase
- Reporting Phase

16.3.1.1 Desktop Research Study Phase

Publications on archaeological and historical cultural heritage related to the field of study and its immediate surroundings have been compiled in order to determine the cultural heritage potential of the project construction and the impact areas. Existence of archaeological or cultural heritage has been recorded in the project construction areas and the project impact areas have been researched. Resources used during desk study were as follows:

- Inventory records of Regional Council for the Conservation of Cultural Property (Sivas)
- Academic publications
- Historic/ topographic and digital maps
- Google Earth Imagines
- Previous reports on the cultural heritage studies conducted in the area (published by other parties/academia, studies conducted by the cultural heritage team, etc.)
- UNESCO Turkey World Heritage Site List

16.3.1.2 Field Research Phase

Field research was conducted by the team of qualified experts of REGIO between 17 April 2024 and 19 April 2024[186].

Field Research on Tangible Cultural Heritage

The cultural heritage team has conducted walkover survey following locations in order to gather field data on the location and features of the tangible cultural heritage elements within the study area:

- All Project Area (Project License Area, Site Roads, ETL, Switchyard and Turbine Locations)[187]

During the archaeological walkover surveys, the archaeological findings that could be observed on the surface were recorded on field survey forms by taking Geographical Positioning System (GPS) coordinates (WGS 1984, 6 degree) together with detailed photographs of the findings from various angles to form a Project archive.

Based on the field survey findings, daily reports were prepared by the cultural heritage team throughout the entire field survey program.

As part of the study, as the primary research method, the walkover survey was conducted by a team composed of two senior archaeologists on all areas indicated in Table 16.1.

During the walkover survey, the field survey team walked within the Project License Area, using a GPS device. The instant communication between the members of the field team, who scanned the field surface in parallel was provided by walkie-talkies. During the walkover surveys, all archaeological traces (such as ceramic shards spread on the surface, architectural elements or traces etc.) observed on the surface of the study area were recorded on the Field

[186] Senior Archaeologist / Intangible Cultural Heritage Expert Halim Özatay and Senior Archaeologist / Intangible Cultural Heritage Expert Yunus Ekim.

[187] The west part of the project construction area is located on Sümbüllüdağ Mountain and the east part of the Project construction area is located on Köroğlu Mountain. The average altitude of these mountainous areas is 2200 m. These areas were covered with snow during the 1st round field survey study which was conducted between the 15th and 16th of December 2023 due to seasonal weather conditions. Hence, the intensive fieldwork on tangible cultural heritage assets could not be carried out during the 1st round field survey study. However, some potential areas were identified during this period using the remote sensing method (via Google Earth and aerial photography) in line with EBRD PR8, Annex 1. The intensive field survey study was carried out in all of the turbine locations, field roads, energy transmission lines, switchyard and potential archaeological areas during the 2nd round of field survey study which was conducted between the 17th and 19th of April 2024.

Surveys Forms (kept in the ESIA database) and relevant findings were incorporated to the Project Archaeological Baseline (Table 16.14).

Field Research on Intangible Cultural Heritage

Field studies for intangible cultural heritage have been carried out using the "qualitative interview technique" with individuals who is knowledgeable about the history and geography of the region, who value those areas, and who know, live, sustain and transfer the intangible cultural elements in those areas. In this research method, face-to-face interviews have been conducted with representatives of the local people and data on intangible cultural heritage elements have been collected. The details of the interviews are given in Table 16.3.

Table 16.3: Details of Interviews

Neighbourhood	Interview Topics	Number of Interviewed People	The Photos from the Interviews
Sivas/ Gürün-Çiçekyurt Village	• Introduction • Briefing participants about the project and the purpose of the interview • Questioning whether International Intangible Cultural Heritage Elements exist in the participant's neighbourhood • Questioning whether National Intangible Cultural Heritage Elements exist in the participant's neighbourhood • Questioning whether Local Intangible Cultural Heritage Elements exist in the participant's neighbourhood	4	
Sivas/ Gürün-Yılanhöyük Village		2	

16.3.1.3 Impact Assessment Phase

Impact assessment studies for cultural heritage were carried out in line with the “Guidance on Heritage Impact Assessments for Cultural World Heritage Properties” of ICOMOS given in Chapter 16.3.2.

16.3.2 Determining Magnitude, Sensitivity, and Impact Significance

The impact of Project activities on the cultural assets are evaluated based on “Guidance on Heritage Impact Assessments for Cultural World Heritage Properties” document prepared by ICOMOS and adopted by the MoCT for its use to properly assess the impact of construction activities on cultural sites. Accordingly, the cultural heritage assets within the scope of Project identified in the area are classified based on their level of importance (Table 16.4).

Table 16.4: Example Guide for Assessing Value of Heritage Assets (ICOMOS CHIA Guidance – Appendix 3A)

Grading	Archaeology	Built heritage or Historic Urban Landscape	Historic Landscape	Intangible Cultural Heritage or Associations
Very High	Sites of acknowledged international importance inscribed as World Heritage (WH) property.	Sites or structures of acknowledged international importance inscribed as of universal importance as WH property.	Landscapes of acknowledged international importance inscribed as WH property.	Areas associated with Intangible Cultural heritage activities as evidenced by the national register
	Individual attributes that convey Outstanding Universal Value (OUV) of the WH property.	Individual attributes that convey OUV of the WH property	Individual attributes that convey OUV of the WH property.	Associations with particular innovations, technical or scientific developments or movements of global significance.
	Assets that can contribute significantly to acknowledged international research objectives.	Other buildings or urban landscapes of recognised international importance.	Historic landscapes of international value, whether designated or not	Associations with particular individuals of global importance
			Extremely well-preserved historic landscapes with exceptional coherence, time depth, or other critical factors.	
High	Nationally designated Archaeological Monuments protected by the State Party's laws	Nationally designated structures with standing remains.	Nationally designated historic landscape of outstanding interest.	Nationally - designated areas or activities associated with globally - important Intangible Cultural Heritage activities
	Undesignated sites of the quality and importance to be designated.	Other buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade.	Undesignated landscapes of outstanding interest.	Associations with particular innovations, technical or scientific developments or movements of national significance
	Assets that can contribute significantly to acknowledged national research objectives.	Conservation Areas containing very Important buildings.	Undesignated landscapes of high quality and importance, and of demonstrable national value	Associations with particular individuals of national importance
		Undesignated structures of clear national importance.	Well preserved historic landscapes, exhibiting considerable coherence, time depth or other critical factors.	
Medium	Designated or undesignated assets that can contribute significantly to regional research objectives.	Designated buildings. Historic (unlisted) buildings that can be shown to have exceptional qualities or historical associations.	Designated special historic landscapes.	Areas associated with Intangible Cultural heritage activities as evidenced by local registers.
		Conservation Areas containing buildings that contribute significantly to its historic character.	Undesignated historic landscapes that would justify special historic landscape designation.	Associations with particular innovations or developments of regional or local significance.
		Historic townscapes or built-up areas with important historic integrity in their buildings or built settings.	Landscapes of regional value.	Associations with particular individuals of regional importance

Grading	Archaeology	Built heritage or Historic Urban Landscape	Historic Landscape	Intangible Cultural Heritage or Associations
			Averagely well-preserved historic landscapes with reasonable coherence, time depth or other critical factors.	
Low	Designated or undesignated assets of local importance.	"Locally Listed" buildings.	Robust undesignated historic landscapes.	Intangible Cultural heritage activities of local significance
	Assets compromised by poor preservation and/or poor survival of contextual associations.	Historic (unlisted) buildings of modest quality in their fabric or historical associations	Historic landscapes with importance to local interest groups	Associations with particular individuals of local importance
	Assets of limited value, but with potential to contribute to local research objectives.	Historic Townscape or built-up areas of limited historic integrity in their buildings or built settings.	Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.	Poor survival of physical areas in which activities occur or are associated
Negligible	Assets with little or no surviving archaeological interest.	Buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character.	Landscapes little or no significant historical interest.	Few associations or ICH vestiges surviving
Unknown potential	The importance of the asset has not been ascertained.	Buildings with some hidden (i.e. inaccessible) potential for historic significance.	n/a	Little is known or recorded about ICH of the area

A 5-stage classification was made in order to evaluate not only the impacts on the tangible and intangible cultural heritage assets within the Project area from the project activities but also the magnitude of the impacts (Table 16.5).

Table 16.5: Criteria for Evaluating the Magnitude of Impact (ICOMOS CHIA Appendix 3B)

Impact Grading	Archaeological attributes	Built heritage or Historic Urban Landscape attributes	Historic landscape attributes	Intangible Cultural Heritage attributes or Associations
Major Change	Changes to attributes that convey OUV of WH properties.	Change to key historic building elements that contribute to OUV, such that the resource is totally altered	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss of OUV.	Major changes to area that affect the ICH activities or associations or visual links and cultural appreciation.
	Most or all key archaeological materials, including those that contribute to OUV such that the resource is totally altered.	Comprehensive changes to the setting.		
	Comprehensive changes to setting.			
Moderate Change	Changes to many key archaeological materials, such that the resource is clearly modified.	Changes to many key historic building elements, such that the resource is significantly modified.	Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.	Considerable changes to area that affect the ICH activities or associations or visual links and cultural appreciation.

Impact Grading	Archaeological attributes	Built heritage or Historic Urban Landscape attributes	Historic landscape attributes	Intangible Cultural Heritage attributes or Associations
	Considerable changes to setting that affect the character of the asset.	Changes to the setting of an historic building, such that it is significantly modified.		
Minor Change	Changes to key archaeological materials, such that the resource is slightly altered.	Change to key historic building elements, such that the asset is slightly different.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited change to historic landscape character.	Changes to area that affect the ICH activities or associations or visual links and cultural appreciation.
	Slight changes to setting.	Change to setting of an historic building, such that it is noticeably changed.		
Negligible Change	Very minor changes to key archaeological materials, or setting	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.	Very minor changes to area that affect the ICH activities or associations or visual links and cultural appreciation.
No Change	No change.	No change to fabric or setting.	No change to elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.	No change

While determining the general impact of the Project activities on the cultural heritage assets within the Project area and its vicinity, a general impact assessment was made taking into account the "scale / severity of the impact" and "the importance of the cultural heritage asset" (Table 16.6).

Table 16.6: General Impact Assessment Matrix

Value of Heritage Asset	Scale & Severity of Change/ Impact				
	No Change	Negligible Change	Minor Change	Moderate Change	Major Change
For Word Heritage List Properties VERY HIGH – Attributes Which Convey Outstanding Universal Value	**The Significance of The Impact Change or The General Impact (Either Adverse or Beneficial)**				
	Neutral	Slight	Moderate/ Large	Large	Very Large
For Other Cultural Heritage Assets	**The Significance of The Impact Change (Either Adverse Or Beneficial)**				
Very High	Neutral	Slight	Moderate/ Large	Large/very Large	Very Large
High	Neutral	Slight	Moderate/ Slight	Moderate/ Large	Large/Very Large

Value of Heritage Asset	Scale & Severity of Change/ Impact				
	No Change	Negligible Change	Minor Change	Moderate Change	Major Change
Medium	Neutral	Neutral/Slight	Slight	Moderate	Moderate/ Large
Low	Neutral	Neutral/Slight	Neutral/Slight	Slight	Slight/ Moderate
Negligible	Neutral	Neutral	Neutral/Slight	Neutral/Slight	Slight

As part of the impact assessment, appropriate mitigation measures are reviewed and included to minimise any potential adverse impacts of the Project. The residual impacts are then determined.

16.3.2.1 Reporting Phase

During all studies, all data collected for tangible and intangible cultural assets were evaluated in different mapping and analysis platforms and the reporting was completed by considering geographical positioning of archaeological and cultural assets and by developing mitigatory actions for protection/salvation of these assets.

16.4 Baseline Conditions

16.4.1 Desktop Studies Findings

16.4.1.1 Tangible Cultural Heritage

The historical background of Gürün and its surroundings, in which the project site is located, dates to ancient times. The region is mentioned as Tegarama in Cappadocian documents. Besides, the region was described to as Tagarama and Gurinian in the Hittite inscriptions. On the other hand, Assyrian written sources mentioned about the region as Tilgarimmu[188]. The region served as a crossroads between Central Anatolian and Mesopotamian cultures throughout history. The region still on an important role in connection between the eastern and central Anatolia. Gürün is located on an important branch of an old trade route which is called the Royal Road in Anatolia.

According to the conducted archaeological research in the region, the first human traces were encountered from the Young Ice Age (Young Dryas or Upper Palaeolithic Period). Additionally, some archaeological traces were also identified in the region which were dated to the Chalcolithic Period. Many settlement mounds included prehistoric layers and remains are recognised in and around the Gürün. The region also became an important settlement during the Middle Kingdom Period of the Hittites. Two rock inscriptions written in Hittite hieroglyphics were found in the Şuğul Valley. In 713 B.C., the region came under Assyrian rule. The Persians conquered the region in 5OO's B.C. Then, the region was ruled by the Kingdom of Cappadocia between 330 B.C. and 17 A.D.

The region was connected to the Sebasteia (Sivas) and started to be named Gaurania during the Byzantine Period. After the 11th century, the region was controlled by Danishmendids (Danishmends), Ilkhanate (Ilkhanids) and Eretna. The region was captured by Ottomans at the beginning of the 15th century[189]. Evliya Çelebi visited Sivas in the middle of the 17th century

[188] Mehmet Ali Öz, Bütün Yönleriyle Gürün, (Seyhan Grafik ve Matbaa), Istanbul, 1999. s. 4-16.

[189] Necip Bostancı, Gürün'ün Sosyolojik Olarak İncelenmesi, (Cum.Ünv. Sos. Bil. Ens.Yayınlanmamış Yüksek Lisans Tezi). Sivas, 1994, s. 15; Sıddık Ünalan, XX. Yüzyıl Sivas Tarihi ve Günümüz İnanç Coğrafyası, (Basılmamış Doktora Tezi- İnönü Ünv. Sos. Bil. Ens. Tarih Eğitimi Ana Bilim Dalı), Malatya, 1997, s. 229.

(1648), he stated that Gürün was a charming township with a thousand households, a mosque, a masjid, an inn, a bath, and a sultan's bazaar in the Sivas Province[190]. Gürün became a district in 1869.

Known settlements having archaeological importance vicinity of the Project Area are presented in Figure **16.2** and Table **16.7**.

[190] Evliya Çelebi, Seyahatname, III-IV, (İkra yayıncılık), İstanbul, 1986, s. 154-160.

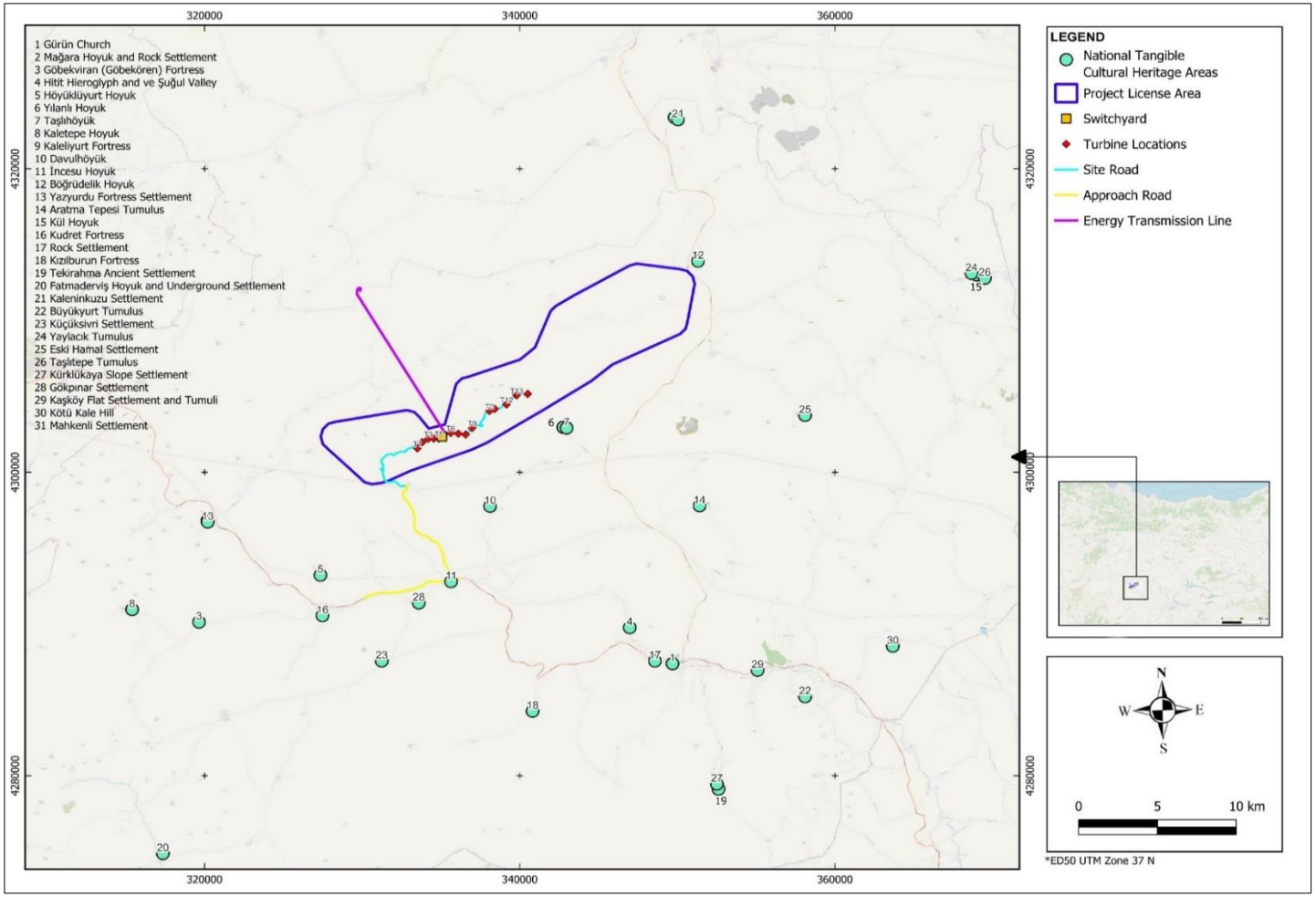


Figure 16.2: National Tangible Cultural Heritage Areas

Table 16.7: National Tangible Cultural Heritage Areas

No	Name of Tangible Cultural Heritage Asset	Province	District	Distance to the Nearest Project Impacts Area (km)	Village	Periods							
						Chalcolithic Period	Early Bronze Age	Middle/Late Bronze Age	Iron Age	Hellenistic Period	Roman Period	Medieval	Ottoman
1	Gürün Church	Sivas	Gürün	18,5	Center								
2	Mağara Hoyuk and Rock Settlement			2	Mağara								
3	Göbekviran (Göbekören) Fortress			13,8	Göbekviran								
4	Hitit Hieroglyph and ve Şuğul Valley			15,2	Kızılören								
5	Höyüklüyurt Hoyuk			6,7	Höyüklüyurt								
6	Yılanlı Hoyuk			1,6	Yılanlıhöyük								
7	Taşlıhöyük			1,7	Yılanlıhöyük								
8	Kaletepe Hoyuk			16,8	Beypınarı								
9	Kaleliyurt Fortress			9,12	Yazyurdu								
10	Davulhöyük			3,9	Davulhöyük								
11	İncesu Hoyuk			7,8	İncesu								
12	Böğrüdelik Hoyuk			0,9	Böğrüdelik								
13	Yazyurdu Fortress Settlement			9	Yazyurdu								
14	Aratma Tepesi Tumulus			10,8	Çamlıca								
15	Kül Hoyuk			18	Sarıca								
16	Kudret Fortress			9,12	Osmandede								
17	Rock Settlement			17	Center								
18	Kızılburun Fortress			17,5	Kızılburun								
19	Tekirahma Ancient Settlement			19,9	Güldede								
20	Fatmaderviş Hoyuk and Underground Settlement			27,9	Yelken								
21	Kaleninkuzu Settlement			27,5	Akdere								
22	Büyükyurt Tumulus			2,3	Mağara								
23	Küçüksivri Settlement			25,6	Bahçeiçi								
24	Yaylacık Tumulus			11,5	Yaylacık								
25	Eski Hamal Settlement			17,5	Sarıca								
26	Taşlıtepe Tumulus			9,5	Karadoruk								
27	Kürklükaya Slope Settlement			18,5	Sarıca								
28	Gökpınar Settlement			27	Yelken								
29	Kaşköy Flat Settlement and Tumuli			8,1	Kaşköy								
30	Kötü Kale Hill			22	Suçatı								
31	Mahkenli Settlement			25,8	Mahkenli								

World Heritage List[191] and World Heritage Tentative[192] List of UNESCO are considered under the internationally recognised cultural heritage sites.

Türkiye has 21 sites inscribed on the World Heritage List of UNESCO (as of 24 April 2024). Those located in the wider region of the Project are listed in Table 16.8 and shown in Figure 16.3. The closest site to the Project is the “Great Mosque and Hospital of Divriği” in Sivas, which is located at a distance of 82,5 km to the west of the Project area.

Among the sites included in the World Heritage Tentative List of UNESCO, 4 sites are located in the wider region of the Project. The closest sites to the Project are the “Sivas Çifte Minareli Madrasah, Buruciye Madrasah and Gök Madrasah” in Sivas, which is located at a distance of 81,2 km to the south of the Project Area.

None of the internationally recognised cultural heritage sites is overlapping with the project area. Therefore, project activities do not have any impact on the areas listed neither in the World Heritage List or the World Heritage Tentative list. In case alternative areas need to be identified during the construction or operation phase of the project, such as quarries or dump sites, the areas listed in Table 16.8 below should be avoided.

Table 16.8: Internationally Recognised Cultural Heritage Areas (World Heritage List and World Heritage Tentative List of UNESCO)

No	Site Name	Province	District	Distance to Project (km)
World Heritage List of UNESCO				
1	Great Mosque and Hospital of Divriği	Sivas	Divriği	82,5
2	Arslantepe Mound	Malatya	Center	112,5
World Heritage Tentative List of UNESCO				
3	Anatolian Seljuks Madrasahs *Sivas Çifte Minareli Madrasah **Buruciye Madrasah ***Gök Madrasah	Sivas	Center	*81,2 **81,2 ***81,2
4	Seljuk Caravanserais on the route from Denizli to Dogubeyazit *Sultan Han	Kayseri	Bünyan	*98,5

[191] https://whc.unesco.org/en/list/
[192] http://whc.unesco.org/en/tentativelists/

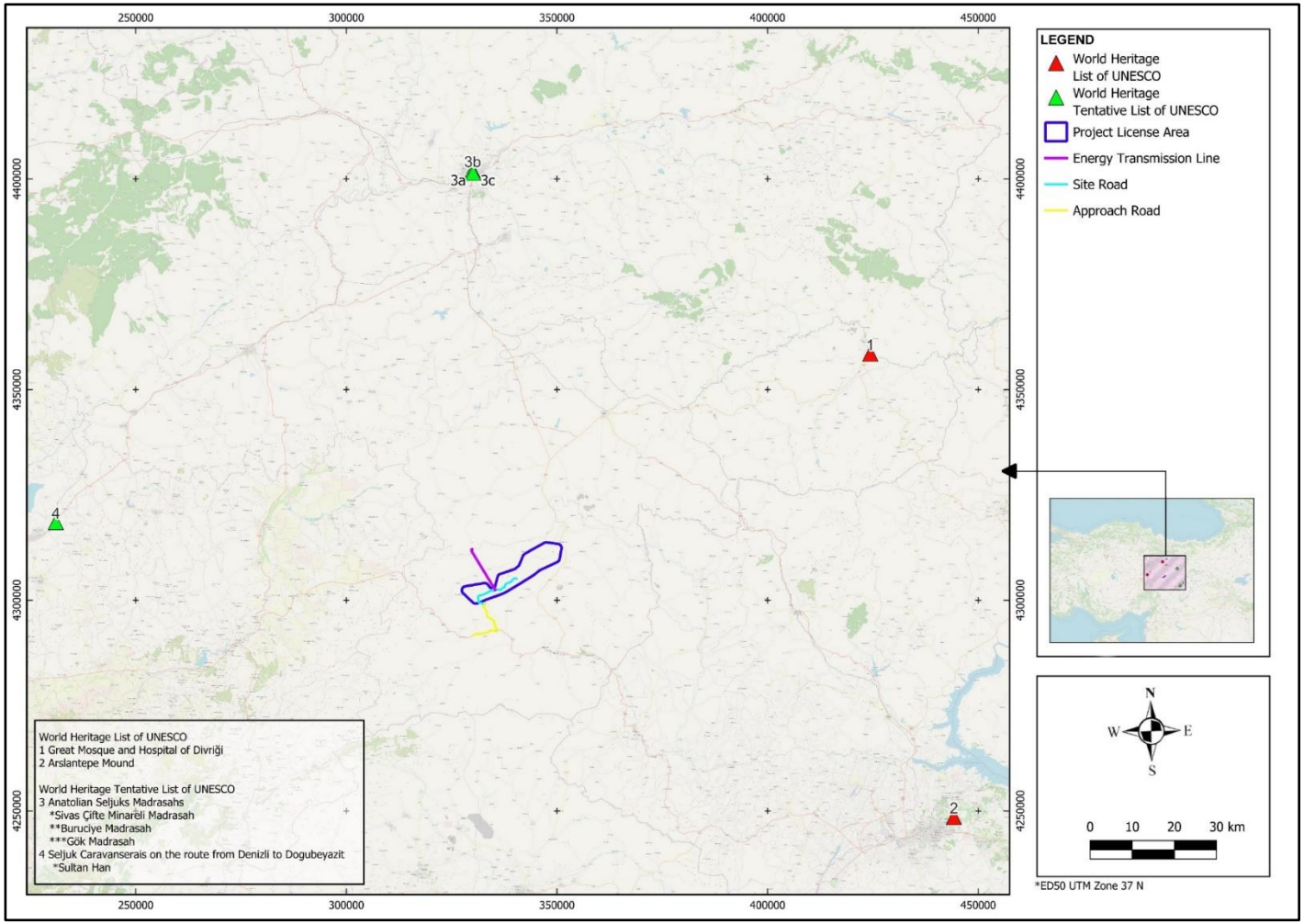


Figure 16.3: International Tangible Cultural Heritage Areas

16.4.1.2 Intangible Cultural Heritage

UNESCO defines intangible cultural heritage as means,practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize[193].

The region which is at an important location from a geographical perspective was preferred by people as a settlement location since the early periods of history due to its arable fields and natural riches such as water resources. The region witnessed occasional migration movements in time. This has greatly contributed to the intangible cultural heritage values in the region.

Nationally and internationally known intangible cultural heritage assets in the close vicinity of the Project Area are presented in Table 16.9 and Table 16.10.

As of 2024, there are 30 elements of Türkiye inscribed on the UNESCO Representative List of Intangible Cultural Heritage. Among these elements, there are 8 elements registered in the region where the Project Area is located (Sivas/ Gürün), as shown in Table 16.9**.**

Table 16.9: International Intangible Cultural Heritage Elements[194]

No	Intangible Cultural Heritage Element	Year of Admission to the UNESCO List
1	Âşıklık (minstrelsy) tradition	2009
2	Traditional Sohbet Meetings	2010
3	Semah, Alevi-Bektaşi ritual	2010
4	Turkish Coffee Culture and Tradition	2013
5	Flatbread Making and Sharing Culture: Lavash, Katyrma, Jupka, Yufka Katrıma, Jupka, Yufka	2016
6	Spring Celebration– Hıdrellez	2017
7	Culture of Çay (Tea), a Symbol of Identity, Hospitality and Social Interaction	2022
8	Iftar/Eftari/Iftar/Iftor and its socio-cultural traditions	2023

Table 16.10: National Intangible Cultural Heritage Elements[195]

Group Headlines of Elements	Name of the Element	Name of the Element in the National Inventory
Traditional Handicraft and Craftsmanship	Woodworking And Wood Carving	Mouthpiece/ Rod
	Knife Making	Knife Making
	Silver Processing	Silversmithing
	Horn And Bone Processing	Bone Comb Making
The Art of Weaving and Its Traditions	Rug Weaving Tradition	Rug Weaving with Sarkisla
	Carpet Weaving Tradition	Sivas Carpet Weaving
Embroidery, Sewing and Knitting Traditions	Knitting	Socks Knitting
Traditional Children's Games and Toys	Traditions Of Playing Children's Games	Lover's Game
		Steel Rod
		Nochchuk

[193] UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, October 17th, 2003.

[194] Please check the following link;

obtained on 24.04.2024 from https://ich.unesco.org/en/state/trkiye-TR

[195] Please check the following link;

obtained on 24.04.2024 from https://aregem.ktb.gov.tr/TR-344757/somut-olmayan-kulturel-miras-turkiye-ulusal-envanteri.html

Group Headlines of Elements	Name of the Element	Name of the Element in the National Inventory
		Barbara
		Stone Pillar
		Strap Grabber
		Jump Rope
		Bezirgân Head
		Line
		Hide-And-Seek
		Tabbed
		Long Ass
Social Practices Related to Cultural Spaces	Visiting Traditions	Visiting Köse Süleyman
Traditions of the Afterlife, Brotherhood of The Way, And Kinship	Kirvelik	Kirvelik
Farewell And Welcome Traditions	Traditions Of Sending Off and Welcoming Soldiers	Soldier Send-Off
Pre/Postnatal and Childhood Traditions	The Tradition of Dental Hygiene	Dental Hygiene.
Marriage Traditions	Dowry Tradition	Dowry Hanging
	Henna Night	Henna Ceremony
Traditions And Practices Based on Beliefs and Beliefs	Alevi-Bektashi Ritual: Semah	Semah
	Rain Prayer Ceremonies	Prayer For Rain
	Festive Traditions	The Gig of My Breast
Beliefs, Celebrations and Traditions Linked to The Calendar	Khidirellez	Hıdrellez
	Crocus Pilaf	Crocus Collection Tradition (Hatapıya)
	Nevruz	Nevruz
	Shepherd's Festivals: Ram Slaughter, Wool-Sheep Flotation	Coach Contribution
	Shepherd's Festivals: Ram Slaughter, Wool-Sheep Flotation	Yunnak
Traditional Festivals and Festivities	Festive Tradition	Şeme Festivals
Narrative Tradition and Traditional Lyric Arts	The Tradition of Singing Mania	Say Mania
Bards Tradition	The Tradition of Minstrel	Infatuation
Traditional Folk Dances	Halay	Aunt Sivas
	Halay	Village Hospitality Aunt
	Halay	Aunt Abdurrahman
	Halay	Pumpkin Aunt
	Halay	Work Aunt

Group Headlines of Elements	Name of the Element	Name of the Element in the National Inventory
Traditional Spectacle Arts and Games	Meddahlik	Meddahlik
	Village Cruising Games	Saya Sightseeing
	Village Cruising Games	Sneak
Traditional Sports	Javelin	Traditional Javelin
	Traditional Turkish Archery	Mounted Archery
Turkish Culinary Culture / Traditional Food and Beverage Making and Social Practices	Ashura Tradition	Ashura
	Molasses, Must and Pestil Production and Traditions	Vintage
	Thin Bread Tradition: Phyllo And Lavash	Lavash
	Thin Bread Tradition: Phyllo And Lavash	Pastry

16.4.2 Field Survey Findings

16.4.2.1 Tangible Cultural Heritage based on Field Surveys

Registered and unregistered tangible cultural heritage sites located within the study area have been identified by the cultural heritage team through ESIA surveys. The sites identified to be located within the study area have been classified based on the criteria presented in Table 16.11.

Table 16.11: Site Classification Criteria

Site Classification	Type of the Surface Material	Size of the Site Taken into Consideration	Intensity Rate of the Surface Material
Registered Sites	Sites that are registered and protected by the Law No. 2863.		
Unregistered Sites			
Archaeological Site	Ceramic, roof tile, architectural stone block, glass object shards, stone object shards, metal object shards, bone etc.	10mx10m	Between 10-100 pieces (High Intensity)
	Architectural remains, etc.		1 tower, 1 wall, 1 cistern etc.
Other Cultural Heritage Sites	Sites including the remains of historical structures such as bridge, civil architecture example, fountain, grave/cemetery and potential archaeological sites etc.		

Distribution of the sites identified within the study area is presented in Table 16.12.

Table 16.12: Cultural Heritage Sites Identified within the Study Area

Province	District	Neighbourhood	Registered Sites	Unregistered Sites		Total
				Archaeological Site	Other Cultural Heritage Sites (Modern/ Old Cemetery, Civilian Architecture,Potential Archaeologica Sites etc.)	
Sivas	Gürün	Böğrüdelik	-	2[196]	-	**2**
Total			**-**	**2**	**-**	**2**

[196] Behram Archaeological Site, Kaletepe Archaeological Site

Distribution of the sites identified with respect to their location/position within the study area is provided in Table 16.13.

Table 16.13: Distribution of Cultural Heritage Sites

Legal Registration Status	Location/ Position of the Site/ Asset	
	Within the Project License Area	Outside the Project License Area, Within the Energy Transmission Lines, Site Road
Registered	**-**	**-**
Unregistered	**2**	**-**
Total	**2**	**0**

List of registered and unregistered sites, together with information on their registration status, classification, features and position, is provided in Table 16.14 and shown on Figure **16.4**.

Table 16.14: Cultural Heritage Sites within the Study Area

No	Site Name	Province	District	Village	Registration Status		Location to the Project		Classification of Areas		Approximate Distance to the Project License Area (km)	Site Descriptions
					Yes	No	Within the Project License Area	Outside the Project License Area, Within the Energy Transmission Lines, Site Road	Arch. Site	Other Cultural Heritage Site		
1	Behram Archaeological Site	Sivas	Gürün	Böğrüdelik		x	x		x		0	The archaeological site is located within the Project License Area. Some stone architectural remains belonging to a modern pastoral settlement have been observed in the archaeological area. There is a spring in the southwest of the encountered area. Ceramic sherds from the Medieval period were observed on the surface of the archaeological site.
2	Kaletepe Archaeological Site	Sivas	Gürün	Kayalar		x	x		x		0	The area was categorised as a "potential archaeological asset" using the remote sensing method (via Google Earth and the review of the 1/25000 scaled topographic maps) in the 1st round of field survey studies for the Project. The area was scanned and determined as an "archaeological site" (a settlement mound, Huyuk) during the second round of field survey studies. Some foundation traces and ceramic sherds (belonging to the Early Bronze Age and Iron Age) have been observed on the surface of the site during the field survey studies.

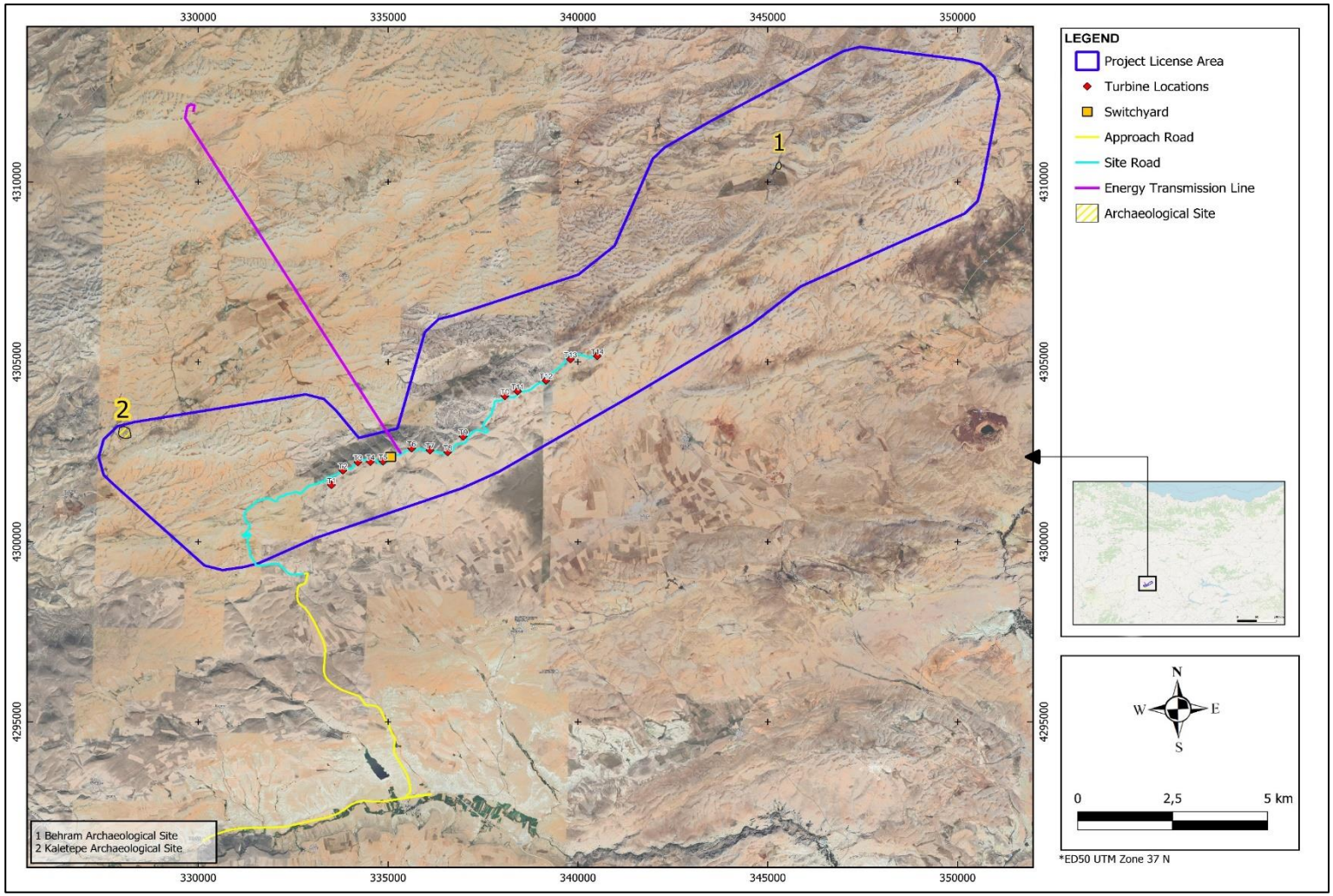
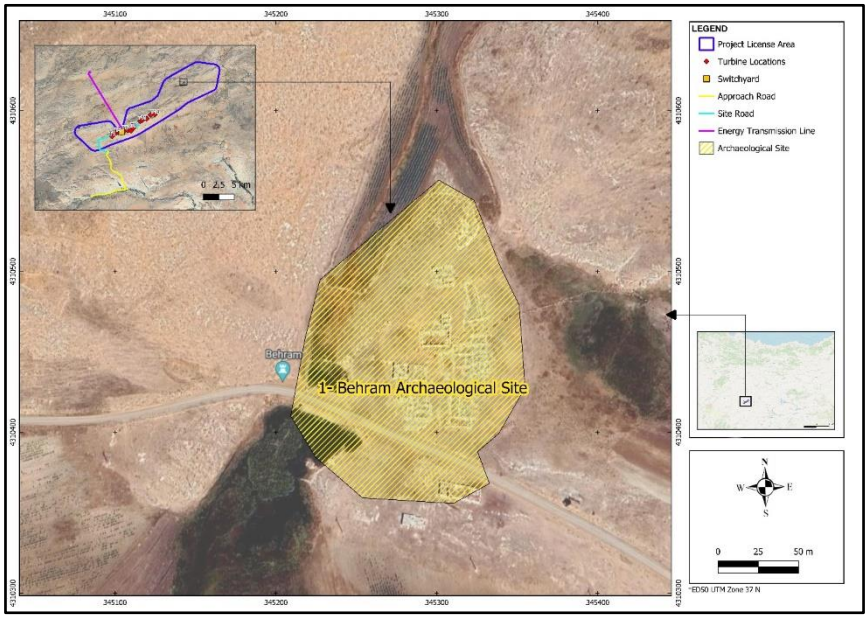


Figure 16.4: Locations of the Cultural Heritage Sites within the Study Area

There are rich natural resources (such as water resources, proximity to agricultural areas) suitable for human settlement around the geographical area where the project is located. On the other hand, there may be tangible cultural heritage assets (chance finds) that have been buried in the geographical area of the Project or its close vicinity and whose existence will be determined by advanced research techniques or that will be unearthed during the construction works. The layouts and photographs pertaining to the unregistered cultural heritage sites are presented below between Figure **16.5** - Figure 16.6.

Behram Archaeological Site

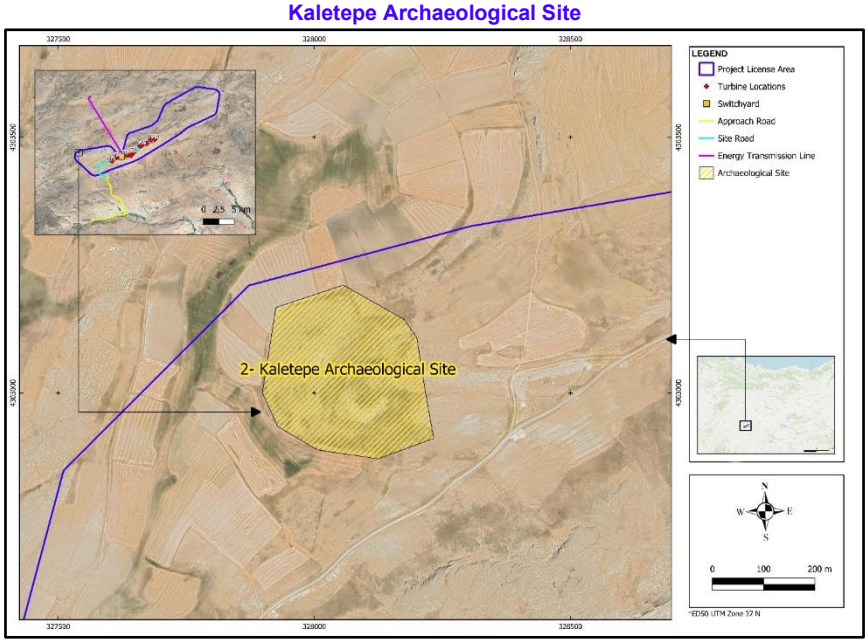


Ceramic Fragments

General View

Figure 16.5: (1) Behram Archaeological Site (unregistered) within the Project License Area

Kaletepe Archaeological Site



Ceramic Fragments

General View

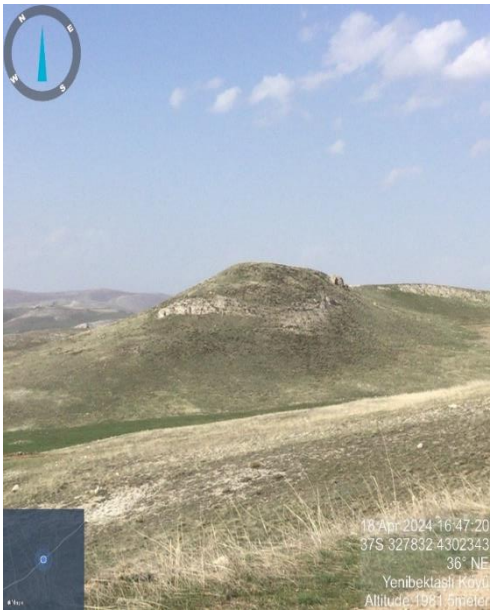


Figure 16.6: (2) Kaletepe Archaeological Site (unregistered) within the Project License Area

16.4.2.2 Intangible Cultural Heritage based on Field Surveys

Findings of the ICH studies conducted within the project are presented below;

- Sunni and Alevi Muslims live around the Project Area.
- Sivas Gürün region where the Project Area is located, cultural elements such as birth, circumcision, military drafting, marriage, pilgrimage and death are among the main transition periods of life. It can be stated that these transition periods are beliefs and practices that have been maintained for centuries from the past to the present. Many beliefs and practices followed during the transition periods of life are mostly practiced in rural or villages located in the close vicinity of the Project Area.
- Agricultural activities in and around the project area are generally carried out with modern methods. The settlements which are located around the Project Licence Area are used as "agriculture villages". All villagers consist of locals from the villages. The agriculture culture, which is essential as a social phenomenon as well as natural and economic characteristics, has been lived by locals since ancient times.
- Sunni and Alevi Muslims live around the Project Area. Therefore, in some settlements covered with the study, there are places of worship and places of visit such as mosques, shrines and graves built following to the beliefs of Sunni Muslims.
- It has been observed with the field study that practices related to traditional medicine and healing continue in the region.
- The dead are buried in the cemeteries at the entrance of the village in accordance with the Muslim traditions. The project does not have a negative effect on these graveyards.
- In neighbourhoods, everyday life (socialization) is a gathering in common village room / village coffee house for men and visiting neighbours for women.
- Weather forecasting traditions are still alive.
- As a result of the conducted studies on the intangible cultural heritage, it was understood that there is a "sheepherding" and "pasture" culture that continues with traditional methods in Çiçekyurt and Yılanhöyük settlements within the Project License Area.

A traditional festival named by locals as "Winter Half" is held in Çiçekyurt and Yılanhöyük villages in January or February. The residents of these villages come together in the village square or a selected village house and eat traditional foods and organise entertainment.

16.5 Assessment of Impacts

It is possible that some activities conducted within the Project and its vicinity may cause irreversible negative effects on tangible and intangible cultural heritage assets.

16.5.1 Construction Phase

Elements that can have an impact on cultural heritage during the construction phase of the Project, are given in Table 16.15.

Table 16.15: Project Based Potential Impact Elements for the Construction Phase

Tangible Cultural Heritage	Intangible Cultural Heritage
• Topsoil stripping • Excavation and Filling • Blasting • Construction traffic movement	• Human Movements • Traffic Movements (vehicles and staff)

Tangible Cultural Heritage	Intangible Cultural Heritage
• Siting of construction sites and other Project/associated facilities • Piling • Landscaping/ earth-mounding • Waste disposal including excess excavated materials • Structures, installation features (fencing, cables etc.) • Presence of workforce • Leaks and spills	

Tangible and Intangible Cultural Heritage

The activities to be conducted during all Project phases may cause direct potential impacts on the cultural heritage receptors, if not properly managed. Potential impacts are direct damage or disturbance to cultural heritage resources.

This can include:

- Physical damage of construction activities including from topsoil stripping, excavation, filling, blasting
- Physical damage of sites, including from noise, vibration and dust due to plant, equipment and heavy vehicles, and from spills and leaks
- Noise and visual intrusion on people's appreciation of cultural heritage
- Disruption of access to cultural heritage sites
- Enhanced access to cultural heritage sites allowing increased opportunity to outside parties for collection of artefacts or damage to resources
- Loss or change of identity or significance of the intangible cultural heritage
- Effects of noise and visual intrusion on the ability of communities to appreciate and use their intangible cultural heritage
- Disruption or diminution of cultural ecosystem services including customary ways of understanding the wider world and for maintaining social relations and group identity.

In addition to direct impacts, damage due to looting and interference may occur. Sites may suffer inadvertent damage or interference. There may be piecemeal illicit removal of portable antiquities from archaeological sites within the Project Area.

Baseline information on the internationally recognised cultural heritage areas has been provided in Chapter 16.3.1.1. Given the distances of the sites under the World Heritage List, it is assessed that the Project will not have an adverse physical or setting impact on them nor will it induce any significant changes to visitor numbers, site access and conservation.

The closest site under the World Heritage List of UNESCO is located at a distance of 82,5 km in the west of the Project Area ("Great Mosque and Hospital of Divriği" in Sivas). It is assessed that the Project will not have an impact on this site.

The Project will adopt a proactive management of the potential Project impacts, prioritising avoidance where this is possible. In case avoidance is not possible, relevant archaeology and cultural heritage management/mitigation measures will be taken in accordance with the national legislation, IFC PS 8, EBRD PR 8 and other applicable standards.

The Project does not propose to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes (examples include, but are not limited to, commercialization of traditional medicinal knowledge or other sacred or traditional technique for processing plants, fibres, or metals). Assessment of the impact of the project on intangible cultural heritage has been conducted in the Project Area and its vicinity in compliance with international standards and local legislation. Findings of the ICH studies conducted within the project are presented previous sections.

Management of Potential Impacts

In line with Article 4 of the Law on Conservation of Cultural and Natural Properties (No. 2863), the main contractor will notify the responsible Museum Directorates or Regional Councils for the Conservation of Cultural Property about the archaeological sites and immovable cultural heritage assets, including registered and unregistered sites, identified within the study area, as given in this ESIA Report. To this end, the information collected through the field surveys (such as site-specific photos, site survey forms, site coordinates, digital data, expert notes, etc.) will be delivered to these institutions in order to initiate official decision processes relevant to these sites. The cultural heritage authorities to be notified in each province are listed in Table 16.16.

Table 16.16: Cultural Heritage Authorities Responsible

Project Related Museum Directorate	Duty Area
Sivas Archaeology Museum Directorate	Project Area within Sivas (Gürün) Province
Project Related Regional Council for the Conservation of Cultural Property	**Duty Area**
Sivas Regional Council for the Conservation of Cultural Property 1	Project Area within Sivas (Gürün) Province

General management measures applicable to different types of sites are listed below. Specific measures and actions stipulated by the relevant cultural heritage authorities in their official decisions (e.g. trial pits, geophysics surveys, salvage excavations, technical drawings, relocation, construction under supervision of the related museum, etc.) will be implemented for the management of potential cultural heritage impacts as part of the Project (

Table 16.17).

Table 16.17: General Management Measures Applicable to Different Classification of Sites

Site Classification	Framework Management Measures
Registered Site	Avoiding physical intervention Archaeological monitoring for potential disturbance of the project activities. Following the decisions of the relevant Regional Council
Archaeological Site	Avoiding physical intervention Notify the cultural heritage authorities Mark as archaeological sensitive area in the Project/construction drawings and plans Avoiding physical intervention/construction until the final decision of the Regional Council is Issued Following/implementing the decisions of the Regional Council (e.g. test or salvage excavation, if required) Archaeological monitoring for implementation of Regional Council decision.

Site Classification	Framework Management Measures
Other Cultural Heritage Site	Avoiding physical intervention Notify the cultural heritage authorities Relocation of moveable cultural heritage asset where applicable Consideration of Project alternatives in case of immovable cultural heritage assets where applicable Avoiding physical intervention/construction until the final decision of the Regional Council is Issued Following/implementing the decisions of the Regional Council (e.g. Technical documentation, measured drawing, etc., if required) Archaeological monitoring for implementation of Regional Council decision.

Cultural Heritage Management Plan

The Cultural Heritage Management Plan developed for the Project based on the findings of the ESIA surveys and assessments is presented.

The key measures to be taken through the implementation of the Cultural Heritage Management Plan are listed below:

- Training on implementation of the Cultural Heritage Management Plan, including the Chance Find Procedure, will be provided to all relevant Contractor and subcontractor personnel as part of the induction training (to be given at the time of employment) and refreshments will be done through toolbox talks throughout the construction phase. If required, the Operator will also train the operations and maintenance personnel on the Cultural Heritage Management Plan, including the Chance Find Procedure.
- Sites located close to the Project License Area and other project sites (e.g. camp sites, dump sites, access roads and quarries etc.) will be protected, where appropriate, by providing temporary flagging/fencing and signage subject with approval from the cultural heritage authorities.
- Sufficient resources for the implementation of the Cultural Heritage Management Plan will be provided by the main contractor. Archaeological monitoring and technical elements of the Chance Find Procedure will be implemented by qualified experts during the construction works, as necessary.
- Following the notifications (for the sites identified as part of ESIA or discovered during construction) to be made to the authorities in line with Article 4 of the Law on Conservation of Cultural and Natural Properties (No. 2863), appropriate measure(s) will be taken in line with the official decisions of the cultural heritage authorities. Such measures may include documentation, application of remote sensing (e.g. geophysical survey) at areas where chance finds are discovered to clarify the character and location of sites and inform design of targeted salvage strategies, excavation of test pits to verify the results of remote sensing at chance find areas, salvage excavation and recording, etc.

16.5.2 Summary of Construction Impacts

The potential Project impacts, proposed mitigation measures and residual impact significance are summarised in **Table 16.18**.

Table 16.18: Construction Impacts, Proposed Mitigation Measures and Residual Impacts (Tangible Cultural Heritage)

No	Cultural Heritage Site Name	Registration Status		Impact Magnitude				Value of Heritage Asset	Significance of Impact (Either Adverse or Beneficial)	Description of Impact and Specific Mitigation Measures
		Registered	Unregistered	Scale & Severity of Change/ Impact	Reversibility	Duration	Frequency[197]			
1	Behram Archaeological Site		x	Minor Change	Irreversible	Short-term	One-off	Low	Neutral/ Slight	The cultural asset is an unregistered archaeological site located within the Project License Area, however, it does not intersect with the turbine areas and no construction activities will occur nearby the Behram Archaeological Site. If additional electricity transmission lines, site roads, switchyards, or similar project facilities are needed under the expansion plan of the project in the near future, the archaeological site may be at risk from the construction effects of these additional facilities. The following procedures about cultural assets have to be conducted during the Project lifespan: ***Official notification to begin the legal protection assessment process should be made by the project to the Sivas Regional Council for the Conservation of Cultural Property.*** ***The identified location should be marked as a cultural heritage sensitive area on project/construction drawings.*** ***Any ground-disturbed activities should not be planned within the identified area.*** ***The construction activities should be avoided from the identified cultural heritage asset during the Project lifespan.*** ***If any ground-disturbing activities are to be carried out around the identified sensitive area borders, daily archaeological monitoring is necessary.***
2	Kaletepe Archaeological Site		x	Minor Change	Irreversible	Short-term	One-off	Low	Neutral/ Slight	The cultural asset is an unregistered archaeological site located within the Project License Area however, it does not intersect with the turbine areas and no construction activities will occur nearby the Kaletepe Archaeological Site. If additional electricity transmission lines, site roads, switchyards, or similar project facilities are needed under the expansion plan of the project in the near future, the archaeological site may be at risk from the construction effects of these additional facilities. The following procedures about cultural assets have to be conducted during the Project lifespan: ***Official notification to begin the legal protection assessment process should be made by the project to the Sivas Regional Council for the Conservation of Cultural Property.*** ***The identified location should be marked as a cultural heritage sensitive area on project/construction drawings.*** ***Any ground-disturbed activities should not be planned within the identified area.*** ***The construction activities should be avoided from the identified cultural heritage asset during the Project lifespan.*** ***If any ground-disturbing activities are to be carried out around the identified sensitive area borders, daily archaeological monitoring is necessary.***

[197] This column designates the possibility of impact recurrence.

Based on the results of impact assessment on the tangible cultural heritage;

- “Value of Heritage Asset” are defined as “Low” in 3 areas,
- “Scale & Severity of Change/ Impact” is defined as “Minor Change” in 3 areas,
- “Significance of Impact (Either Adverse or Beneficial)”, which is evaluated by overlapping the parameters “Value of Heritage Asset” and “Scale & Severity of Change/ Impact”, is found to be “Neutral/ Slight” in 3 areas (Table **16.18**).

As the result of desk studies and field works, any harm to intangible cultural heritage patterns because of the Project activities is not foreseen for all settlements in the study area.

16.5.3 Operation phase

Provided that the impact-mitigation measures are taken during the construction phase there will be no element (human movements etc.) that may have an impact on cultural heritage during the operating phase and there will be no related impact.

16.6 Mitigation Measures

16.6.1 Construction Phase

16.6.1.1 Tangible Cultural Heritage

During the construction works within the scope of the wind power plant project, seven cultural heritage sites (5 unregistered, 2 registered) will be affected. Specific mitigation recommendations designed to minimise or completely eliminate adverse effects on these areas are presented in Table **16.18**.

Additional mitigation measures proposed to be taken by the EPC Contractor for the construction phase are summarized below:

- A complaint mechanism shall be established within the scope of the Project, through which complaints related to cultural heritage can be submitted and the complaints and producing solutions are periodically monitored.
- In case of a cultural heritage related salvage and/or test excavation (including restoration/conservation) required, it should be ensured that necessary staff, technical assistance, other necessary services and equipment are provided.
- The Project Company will train the employees about Cultural Heritage Management Plan and Chance Find Procedure.
- The Project Company will ensure that Cultural Heritage Management Plan and Chance Find Procedure are adequately enforced during all ground disturbance activities.

In addition, the Cultural Heritage Management Plan (its sub-procedure The Chance Find Procedure), which were prepared to eliminate, minimize and prevent the effects of the project construction phase on cultural assets, should be known and implemented by all parties involved in the Project.

16.6.1.2 Intangible Cultural Heritage

The local people who are living in the villages and neighbourhoods of the Project's surrounding areas are composed of Turkish people who have adopted the Islamic/ Sunni and Alevi faith. Any change did not occur regarding the intangible cultural heritage assets of the settlements.

Sivas-Gürün region where the Project Area is located, cultural elements such as birth, circumcision, military drafting, marriage, pilgrimage and death are among the main transition periods of life. It can be stated that these transition periods are beliefs and practices that have

been maintained for centuries from the past to the present. Many beliefs and practices followed during the transition periods of life are mostly practiced in rural or villages located in the close vicinity of the Project Area.

It was observed that the locals still continue their existing traditions. Therefore, no recommendations are made as no adverse effects on intangible cultural heritage are expected.

A possible positive effect on the intangible cultural heritage is not expected. Cumulatively, the impact of the Project on intangible cultural heritage can be evaluated as Neutral.

16.6.2 Operation phase

Since the measures for the negative effects that the Project may have on cultural assets will be eliminated by the implementation of Cultural Heritage Management Plan during the construction phase, there will be no cultural assets to be intervened during the operation phase, hence there are no recommendations for the operation phase.

There is no need for "a suggestion for cumulative impact" as project impact sources do not have any cumulative effect on tangible and intangible cultural heritage.

16.7 Summary of Outcomes

16.7.1 Tangible Cultural Heritage

According to the provided documents, the Sivas Regional Council for the Conservation of Cultural Property carried out a field visit to the Project Licence Area to make an archaeological evaluation. However, this field visit could not be completed due to seasonal restrictions (the surface was covered with snow) and was postponed. However, the Council reviewed their inventory records[198] about the archaeological assets and officially notified the Project that there was no registered cultural heritage asset in the project licence area.

Despite that, 2 cultural heritage asset within the project licence boundaries have been encountered during the cultural heritage impact assessment studies.

On the other hand, some indirect effects of construction activities (such as operation of crushers, vibration created by heavy tonnage vehicle traffic) on cultural assets may occur. Therefore, when designing all Project activities, it is recommended to take the existing archaeological assets into account and to take the necessary measures specified in Table **16.18** and Section 16.5 in order to minimize the possible negative effects on these assets.

As a result of the surface surveys and archaeological excavations carried out in the past years in and around the Project area, many cultural heritage sites have been identified. It is also known that scientific studies are still ongoing in these areas (Table 16.7).

In this context, it is possible to encounter new cultural assets during the construction activities to be carried out at the Project site which will require intervention in the soil. Therefore, during the construction phase of the Project, it is necessary to complete the elements for monitoring and training specified in the Corporate Cultural Heritage Management Plan, and to implement the Corporate Chance Find Procedure in case of encountering any tangible cultural heritage assets during the construction work.

After the construction works currently being carried out or to be carried out in the future on the existing cultural heritage areas and their surroundings, some negative effects such as deterioration of the silhouette of the archaeological site and restriction of accessibility of visitors

[198] EIA 2018, Annex 14: Sivas Regional Board of Protection of Cultural Assets Directorate's letter dated 29.12.2017 and 2321.

to the area(s) may also occur in terms of the visuality and accessibility of the cultural heritage sites.

16.7.2 Intangible Cultural Heritage

Potential sources of impact have no effect on intangible cultural heritage elements identified in the impact area of the Project.

During the construction phase of the Project, it is necessary to fulfill the elements for monitoring and training specified in the Corporate Cultural Heritage Management Plan and to implement the Corporate Chance Find Procedure in case of encountering any intangible cultural heritage assets during the construction works.

17 Cumulative Impacts

17.1 Methodology and Project Standards

The ESIA Study for the Project recognizes the importance of Cumulative Impact Assessment (CIA) in evaluating the combined impacts of past, present, and foreseeable future developments on the environmental and social landscape. CIA extends beyond the boundaries of individual projects, aiming to comprehend the synergistic, additive, or countervailing impacts that multiple activities may exert on various resources and ecosystems.

The need for CIA emerges because cumulative impacts can result from the successive, incremental, and/or combined impacts of multiple actions, projects, or activities. These impacts can have significant consequences on the environment and affected communities. CIA is necessary to identify and manage these cumulative impacts, which may not be expected in the case of a stand-alone development. It helps assess the potential impacts and risks of a proposed development over time, considering the impacts of other existing, planned, and reasonably anticipated future developments. CIA also aims to ensure the sustainability and viability of selected environmental and social elements, address the concerns of affected communities, and support the development of governance structures for managing cumulative impacts.

The decision to conduct a CIA for the Project is rooted in the recognition that individual projects, while complying with environmental and social standards, may collectively contribute to significant impacts on shared resources. By understanding these cumulative impacts, the project owners proactively address potential environmental and social challenges, enhance sustainability, and foster responsible project development.

In the context of the Project, where there are other nearby activities such as other wind power plants, industrial zones, and electricity transmission lines, conducting a CIA is crucial to assess the cumulative impacts of these developments. Within this scope, the process identified within IFC's *Good Practice Handbook: Cumulative Impact Assessment and Management*[199] was followed. Accordingly, the methodology that was followed through the implementation of the cumulative impact assessment is summarised below:

- Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

In this initial step, the CIA process will collaboratively identify and agree upon the Valued Environmental and Social Component (VECs) in consultation with stakeholders. The temporal and spatial boundaries of the analysis will be established, encompassing the full range of potential impacts, drawing upon regional studies, environmental assessments, and stakeholder consultations.

- Step 2: Scoping Phase II – Other Activities and Environmental Drivers

The assessment will then identify all developments (including existing and planned activities) within the defined boundaries and natural environmental and social stressors affecting the VECs (e.g., climate change and population growth). This phase aims to comprehensively capture all sources of stress on VECs, both human-induced and natural, contributing to a holistic understanding of the cumulative impacts.

[199] IFC's Good Practice Handbook Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets, 2013

- Step 3: Establish Information on Baseline Status of VECs

This step involves defining the existing condition of VECs, understanding their resilience, and assessing trends. The project will utilize existing data and, where necessary, collect targeted baseline information to establish a clear starting point for evaluating cumulative impacts.

- Step 4: Assessment Cumulative Impacts on VECs

The focus here is on identifying potential impacts and assessing their expected impacts on the long-term sustainability and viability of VECs. The analysis is future-oriented, estimating the aggregated stresses on VECs resulting from various developments, both project-specific and external.

- Step 5: Assess Significance of Predicted Cumulative Impacts

This step involves defining appropriate thresholds and indicators, determining the magnitude and significance of impacts, and identifying potential trade-offs. The significance determination considers the sustainability and viability of the affected resources and ecosystems, providing a basis for informed decision-making.

- Step 6: Management of Cumulative Impacts – Design and Implementation

Finally, the project will utilize the mitigation hierarchy to design and implement management strategies. This includes engaging relevant stakeholders, proposing mitigation and monitoring programs, and adopting adaptive management practices to address uncertainties.

In summary, the Cumulative Impact Assessment for the Project is a proactive and iterative process aimed at understanding, managing, and mitigating the combined impacts of various activities, ensuring a responsible and sustainable approach to wind power development in the region.

17.2 Cumulative Impact Assessment

17.2.1 Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

The Scoping Phase I of the CIA for the Project marks the initiation of a comprehensive and collaborative process. This phase lays the groundwork for understanding the VECs and establishing the spatial and temporal boundaries crucial for evaluating cumulative impacts.

The primary objectives of Scoping Phase I are threefold:

Identify and agree on VECs in Consultation with Stakeholders: This collaborative approach ensures that the chosen VECs align with both scientific assessments and the values held by local communities and other stakeholders. Early engagement fosters transparency and inclusivity.

Determine the Time Frame for the Analysis: Establishing the temporal scope is essential for capturing the dynamic nature of cumulative impacts. The time frame should encompass both the historical context and a forward-looking perspective to anticipate foreseeable developments.

Establish the Geographic Scope of the Analysis: Defining the geographic boundaries is critical for delimiting the area influenced by the cumulative impacts. This includes considering both the direct project area and potential indirect impacts extending beyond traditional project boundaries.

The scoping process involves an iterative approach, recognizing that boundaries may evolve as more information becomes available. Best practices include open, participatory, transparent, and meaningful consultations to ensure a well-informed scoping decision. Within this scope, it

shall be noted that stakeholder engagement activities carried out within the scope of this ESIA studies had also considered cumulative impacts as well. With this regard, it can be said that the stakeholders identified in *Chapter 18: Stakeholder Engagement, Information Disclosure and Consultation* also covers the parties whose involvement is key for CIA. To summarize:

- Ministry of Energy and Natural Resources
  - General Directorate of Mining Affairs
- Ministry of Environment, Urbanization, and Climate Change (formerly known as Ministry of Environment and Urbanization)
  - General Directorate of Environmental Impact Assessment, Permitting and Inspection
  - General Directorate of Spatial Planning
- Ministry of Agriculture and Forestry (formerly known as Ministry of Forestry and Water Affairs)
  - General Directorate of Nature Conservation and National Parks
  - General Directorate of State Hydraulic Works
  - General Directorate of Forestry
- Ministry of Culture and Tourism
  - Sivas Cultural Heritage Preservation Regional Board Directorate
- Sivas Governorship
  - Provincial Directorate of Environment, Urbanization and Climate Change
  - Provincial Disaster and Emergency Directorate
  - Provincial Directorate of Food, Agriculture and Forestry
- Gürün Municipality
  - Department of Water and Sewerage
- Sivas City Administration
  - Directorate of Zoning and Urban Development

Table 17.1: Valued Environmental and Social Component (VECs)

Area of Concern	VEC	Specified VECs
Land Loss	Agriculture and Animal Husbandry	Agricultural and animal grazing Areas
Water Sources	Fırat-Dicle Basin Water Quality	Surface and Groundwater resources
Air emissions, noise	Air quality and noise levels in settlements nearby the Project area	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages
Landscape & Visual	Quality of landscape and visual	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages
	Natural Habitats	C2.3-Permanent non-tidal, smooth-flowing watercourses D4.1- Rich fens, including eutrophic tall-herb fens and calcareous flushes and soaks E1.2-Perennial calcareous grassland and basic steppes H3.2 Basic and ultra basic cliff rock H3.5- Almost bare rock pavements, including limestone pavements
Biodiversity	Critical Habitat / Critical Habitat Trigger Species	Habitats, nesting and perching areas that support *Montivipera albizona* and *Dryomys laniger (potential CH trigger)*

Area of Concern	VEC	Specified VECs
	Flora Species with High Conservation Priority Priority Biodiversity Features	Endemic and / or Red List category CR, EN, VU, Flora *Allium yamadagense* *Asyneuma davisianum* *Astragalus stridii* *Campanula pinnatifida var. pinnatifida* *Minuartia dianthifolia subsp. cataonica* *Minuartia rimarum var. multiflora* *Astragalus dumanii* *Paronychia cataonica* *Thymus cappadocicus* *Thesium aureum* *Hyacinhella acutiloba*
	Birds	Nationally CR and EN species *Accipiter brevipes* *Aquila chrysaetos* *Aquila heliaca* *Aquila nipalensis* *Bubo bubo* *Buteo rufinus* *Ciconia ciconia* *Ciconia nigra* *Circaetus gallicus* *Circus aeruginosus* *Circus cyaneus* *Circus macrourus* *Circus pygargus* *Falco biarmicus* *Falco cherrug* *Falco vespertinus* *Falco columbarius* *Falco naumanni* *Falco peregrinus* *Gypaetus barbatus* *Gyps fulvus* *Haliaeetus albicilla* *Hieraaetus pennatus* *Milvus migrans* *Milvus milvus* *Neophron percnopterus* *Otis tarda* *Pandion haliaetus* *Pernis apivorus*
	Bats	High collision risk species, and threatened bat species Mid and long-distance migrants *Hypsugo savii* *Miniopterus schreibersii* *Nyctalus lasiopterus* *Nyctalus leisleri* *Nyctalus noctula* *Pipistrellus pipistrellus* *Vespertilio murinus*
	Fauna Species with High Conservation Priority	Endemic and / or Red List category CR, EN, VU, Fauna *Testudo graeca*

Area of Concern	VEC	Specified VECs
	Priority Biodiversity Features	*Microtus irani* *Vormela peregusna* *Lynx lynx*
Cultural Heritage	Unregistered Cultural Heritage Sites	Behram Archaeological Site and Kaletepe Archaeological Site
Socio-Economic Environment	Land Acquisition and Economic Displacement	Local community members who use public pasture lands for animal husbandry Vulnerable groups who may disproportionately be affected from the land transaction process of the new investments in the region
	Employment	Unemployed local community members who will benefit from the employment opportunities
	Infrastructural Services	Local community members that may be affected from the construction activities in accessing to the infrastructural services
Community Health & Safety	Safety from blade and ice throw and shadow flicker risk	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages
	Aviation	Sivas Airport Kayseri Airport
	Traffic Safety	Çiçekyurt Village Road Kayseri-Malatya Road

Geographic boundaries should consider the area directly affected by the project (DAI), the important resources within the DAI, and potential impacts beyond the DAI. Temporal boundaries align with the complete life cycle of the proposed development, considering the most conservative time frame between expected impacts. With this regard, an area covering a 15-km buffer has been selected as Cumulative Impact AoI. With regards to biodiversity, since the Project is not located on a migratory route, and it is located on a significant ecological barrier, namely the Anatolian barrier, an extended AoI is not needed and the same AoI will be applied.

17.2.2 Step 2: Scoping Phase II – Other Activities and Environmental Drivers

Scoping Phase II of the CIA for the Project delves deeper into understanding the broader context surrounding the Project area. This phase focuses on identifying other past, existing, or planned activities within the analytical boundaries and natural environmental and social drivers on VECs (e.g., climate change). The primary objectives of Scoping Phase II are as follows:

Identify Other Past, Existing, or Planned Activities: A comprehensive inventory of activities within the defined boundaries helps in assessing the cumulative impacts on VECs. This includes both human-induced developments and natural environmental and social drivers.

Assess the Potential Presence of Natural and Social External Influences: Beyond human activities, understanding natural environmental and social drivers, such as climate change and population growth, is essential. These external factors can interact with VECs and influence their condition.

Reasonably predictable projects, emphasizing reference to local, regional, or national development plans were identified within the scope of the CIA Process. It was determined, due to the high wind potential and its ease to have access on the land, and the availability of electricity transmission infrastructure; the close vicinity of the Project Area is foreseen to have a variety of wind power projects.

Accordingly, the identified current and future drivers are defined as below Table 17.2. It shall be noted Table 17.2 includes the facilities/projects acting as environmental drivers. The additional

environmental drivers such as climate change, urbanisation etc. are assessed in the following chapters in detail.

Table 17.2: Details of Existing and Planned Activities and Environmental Drivers

Name	Activity	Capacity	Distance to WPP License Area	Project Owner	Status
Kangal Wind Power Plant	WPP	128 MWm / 128 MWe with 63 turbines	~ 13 km	Kangal Electric Energy Production and Trade Inc.	Pre-Construction "EIA Positive" Decision was obtained on September 18th, 2023. According to information obtained from Kangal WPP representatives and EIA Report, 6 additional turbines will be constructed and construction activities for the capacity extension are expected to take place in 2024.
Kangal Wind Power Plant Capacity Extension	WPP capacity extension	27 MWm / 27 MWe with 6 turbines	~8 km	Kangal Electric Energy Production and Trade Inc.	Status Unknown "EIA Positive" Decision was obtained on October 4th, 2023.
R3-Sivas-1-2 Wind Power Plant	WPP	91 MWm / 40 MWe with 13 turbines	~ 5.5 km	Aşiyan Energy Production Inc. Singing. Tic. Inc.	Status Unknown "EIA Not Required" Decision for the Iron Ore Enrichment Plant and Mine Waste Storage Area was obtained on April 20th, 2021. "EIA Not Required" Decision for the Iron Mine was obtained on September 6th, 2021.
Eren Wind Power Plant	WPP	55 MWm/ 17 Turbines with Electricity Storage	~ 4 km	Entek Electricity Generation Inc..	EIA Positive was granted on 14 September 2023. No construction is in place yet
Konakpinar Wind Power Plant	WPP	24 MW with 9 Turbines	~ 5.8 km	Akyurt Wind Energy Production and Trade Inc.	EIA Not Required Decision was granted on 26 July 2022. No construction is in place yet
Yellice Wind Power Plant	WPP	60 MWm/ 32 Turbines	~ 14.5 km	YEKA WPP Electricity Production Inc.	EIA Positive was granted on 4 January 2024. No construction is in place yet
First Iron Mine, Iron Ore Enrichment Plant and Mine Waste Storage Area (License No: 201600083)	Quarry Crushing, screening, washing, drying Ore Enrichment Plant	390.000 tonnes/year – 1694 ha	Adjacent/some section is inside	First Mining Ind. And Com. Inc.	EIA not Required decision was obtained on 05 April 2021. No construction is in place yet.
Polat Iron Furnace with License No: 202200134 (Access No: 3416812), Crushing-Screening and Enrichment Facility and Mine Waste Storage Facility	Quarry Crushing, screening, washing, drying Ore Enrichment Plant	319.000 tonnes/year – 1164 ha	Adjacent/some section is inside	Polat Textile Breeding Tourism Mine Automotive Contracting Trade Ltd.	EIA not Required decision was obtained on 30 January 2024. No construction is in place yet.

Name	Activity	Capacity	Distance to WPP License Area	Project Owner	Status
DSI -Access No:3413529 Clay Quarry	Quarry	150.000 tonnes/year – 10 ha	~ 2.6 km	DSI 19th Regional Directorate	EIA not Required decision was obtained on 11 August 2022. No construction is in place yet.
Kangal TPP and Kangal-Kalburçayırı Coal Mining	Coal Mine, Thermal Power Plant	457 MW License No 53318 = 8047.7662 ha License No 20058878 = 1931.7843 ha License No 74005 = 1949.5885 ha License No 20058554 = 1733.2144 ha License No 20058498 = 1950.8763 ha License No 61156 = 1955.877 ha License No 4558 = 402.6116 ha License No 48142 = 236.4644 ha Total=18208 ha	~ 5.3 km	Konya Şeker Enerji	Existing.
Kayseri-Keban 2 ETL	Electricity Transmission Line	380 kV	Adjacent	TEIAS	Existing

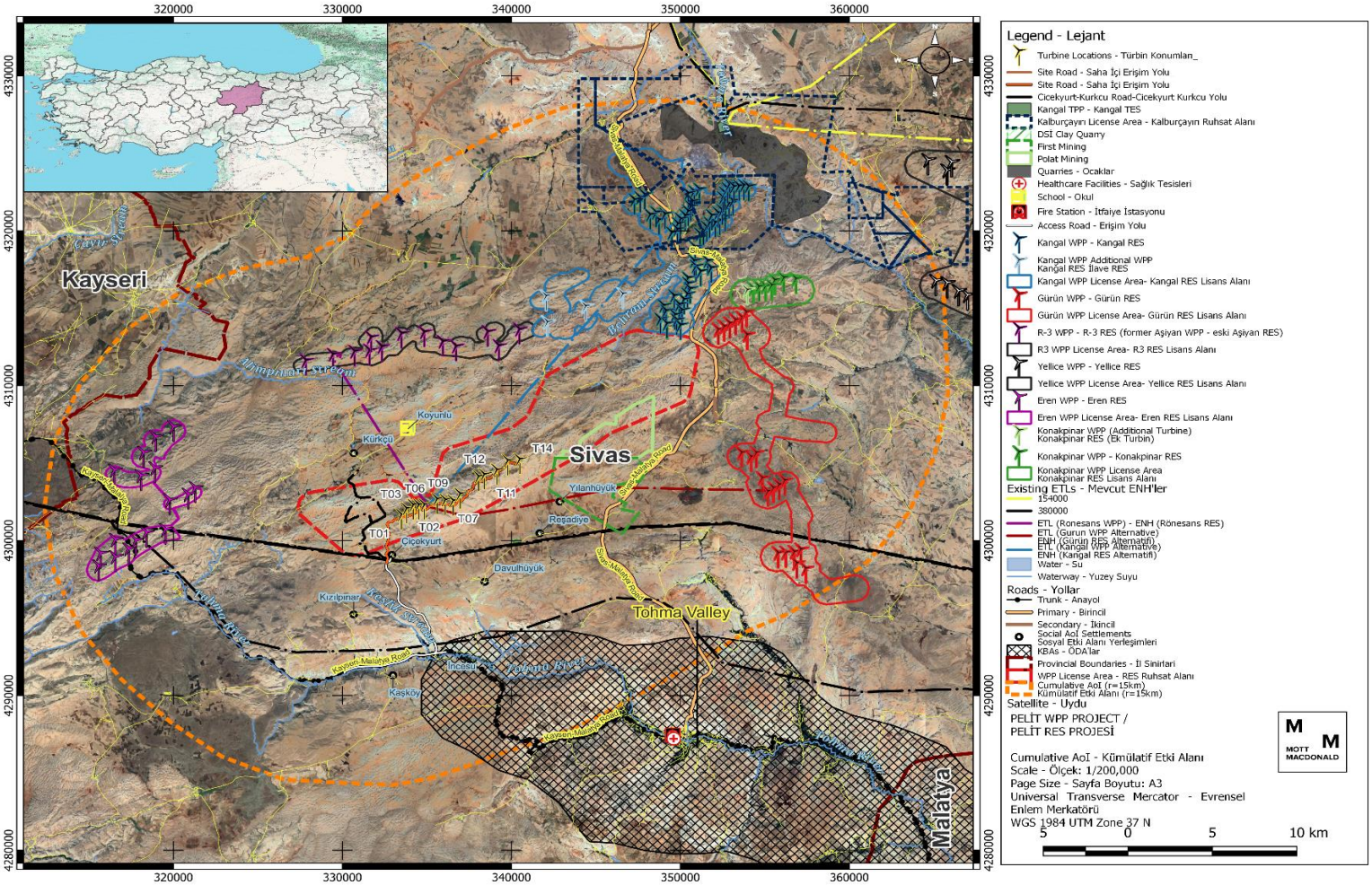


Figure 17.1: Locations of Existing and Planned Activities and Environmental Drivers

17.2.3 Step 3: Establish Information on Baseline Status of VECs

Step 3 of the CIA process for the Project involves establishing comprehensive information on the baseline status of VECs. This step is crucial for understanding the existing condition of VECs, their potential reaction to stress, resilience, and recovery time. The key objectives of Step 3 are:

Define the Existing Condition of VECs: Obtain a clear understanding of the current state of identified VECs. This includes assessing their health, structure, and overall well-being.

Understand Potential Reaction to Stress, Resilience, and Recovery Time: Evaluate how VECs may respond to drivers, their capacity to recover, and the time required for recovery. This insight is vital for predicting cumulative impacts accurately.

Assess Trends: Analyse historical trends to identify any changes in the condition of VECs over time. This historical perspective provides context for anticipating future cumulative impacts.

17.2.3.1 Agriculture and Animal Husbandry

The Project area of Pelit WPP will encompass in Sivas Province; Gürün District; Kürkçü, Koyunlu, Böğrüdelik, Yılanhöyük, Yenibektaşlı, Çiçekyurt, Kayalar, and Konakpınar Villages. According to the District Governorship of Gürün, the district's main income sources are agriculture and animal husbandry, with wheat, barley, and chickpea being the main crops. The district is also known for apples, apricots, mulberries, and walnuts. With 14 fish production farms, Gürün also has 15,000 cattle, 110,000 small cattle, 110,000 poultry, and 13,000 beehives[200].

Moreover, the Çiçekyurt village's main income sources are agriculture and animal husbandry, with the most cultivated agricultural products being barley, wheat, and alfalfa. The village has 35-40 cattle and 2,500 small cattle, and residents perform forest grazing for animal husbandry. There are no mushroom picking activities, but one family in the village carries out organic honey production with approximately 100 hives. The agricultural farmers in the village are members of the Davulhüyük Agricultural and Credit Cooperative and the Karacalar Irrigation Union. Barley, wheat, and chickpeas are the main sources of income in Kürkçü village, with 50 cattle and 10,000 small cattle. The Davulhüyük village has 500 cattle and 8,000 small cattle, and residents perform forest grazing for animal husbandry. The Koyunlu village also has 50 cattle and 10,000 small cattle, and residents perform forest grazing for animal husbandry. The Reşadiye village's main sources of income are barley, wheat, and chickpeas, with 500 small cattle and forest grazing for animal husbandry. The Yılanhüyük village has 60 cattle and 3,000 small cattle, and residents perform forest grazing for animal husbandry. Mushroom picking activities are carried out for individual consumption.

To understand the historical change in the land use and land cover status inside the Cumulative AoI, Corine 2006 and Corine 2018 LULC data has been compared. As it can be seen from Table 17.3, area occupied by industrial or commercial units has been increased by 152.8%, and Mineral extraction sites has been increased by 30.7%. With this regard, Discontinuous urban fabric area has increased 23.2%.

Table 17.3: Corine 2006 and Corine 2018 LULC Comparison

Corine Code – Description	Area in 2006 (ha)	Area in 2018 (ha)	Change %
112 - Discontinuous urban fabric	115.2	142.0	23.2%
121 - Industrial or commercial units	107.6	271.9	**152.8%**

[200] District Governorship of Gürün, General Information on Gürün District. Retrieved from http://www.gurun.gov.tr/ on 23 January 2024.

Corine Code – Description	Area in 2006 (ha)	Area in 2018 (ha)	Change %
131 - Mineral extraction sites	1,416.5	1,851.3	**30.7%**
211 - Non-irrigated arable land	27,690.8	28,303.1	2.2%
212 - Permanently irrigated land	8,038.9	7,991.0	-0.6%
222 - Fruit trees and berry plantations	49.6	49.4	-0.4%
231 - Pastures	1,584.8	1,915.1	20.8%
242 - Complex cultivation patterns	3,087.4	2,870.1	-7.0%
243 - Land principally occupied by agriculture	18,047.5	17,311.0	-4.1%
321 - Natural grasslands	15,563.0	14,855.8	-4.5%
324 - Transitional woodland-shrub	34.5	34.5	0.0%
332 - Bare rocks	2,482.1	2,406.1	-3.1%
333 - Sparsely vegetated areas	90,054.0	90,270.7	0.2%
TOTAL	**168,271.8**	**168,271.8**	

With this regard, the mentioned changes were examined in detail according to the maps provided Figure 17.2 and Figure **17.3**.

It can be seen that the increase in the industrial or commercial units is directly related to the installation of wind power plants in the region. Also, the increase in the land occupied by mineral extraction sites can directly be explained by the Kangal-Kalburçayırı Coal Mining. In addition, even though it is seen as the discontinuous urban fabric area has increased by 23.2%, this can be explained as the Göbekören village of Sivas Province was previously identified as Land principally occupied by agriculture although the settlement was existent. Moreover, although it is seen as the pasture areas have been increase by 20.8%, this is due to the fact that some areas formerly identified as natural grasslands within Corine 2006 LULC, has been identified as pasturelands which shows similar land cover patterns. Thus, it can be said the natural areas including pasturelands have not been changed significantly through years.

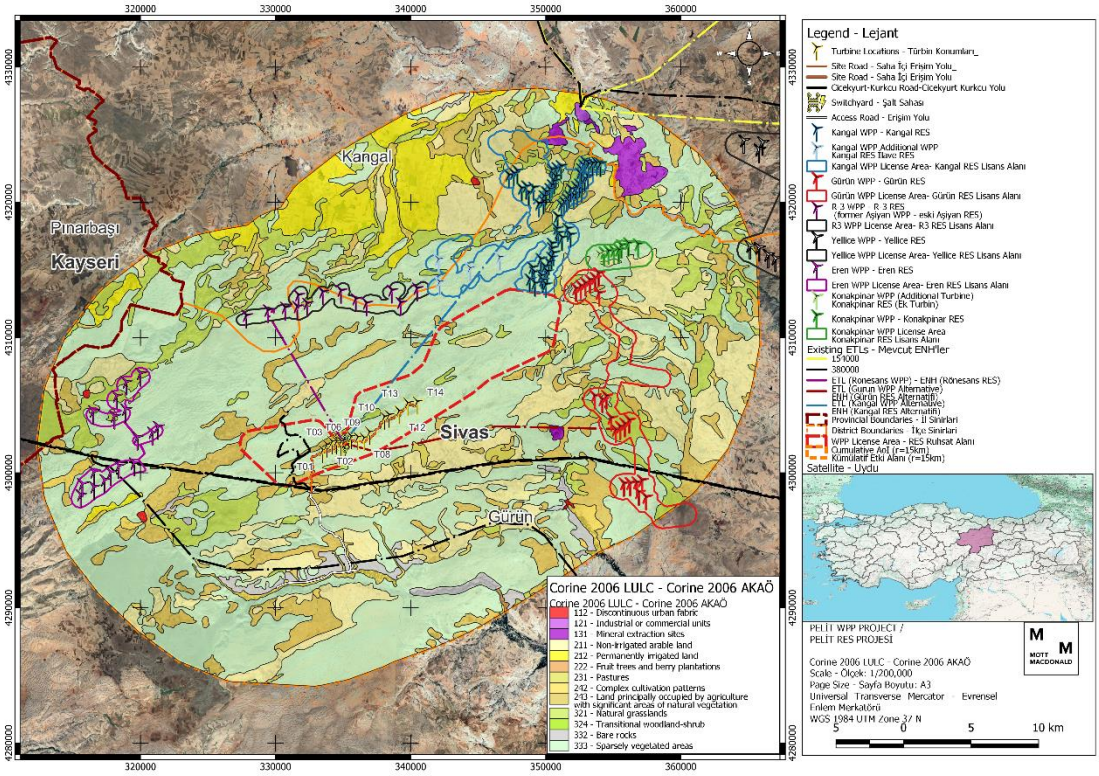


Figure 17.2: Cumulative AoI - Corine 2006 LULC

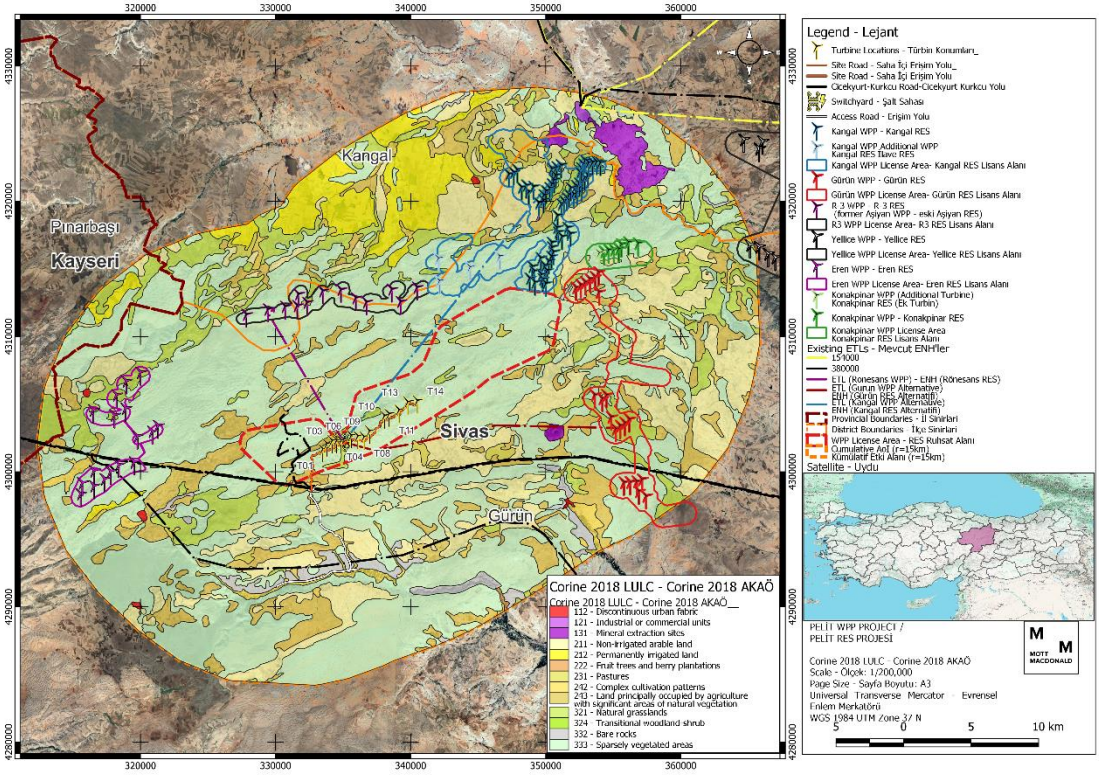


Figure 17.3: Cumulative AoI - Corine 2018 LULC

17.2.3.2 Ambient air quality & noise levels

Detailed examination on ambient air quality and noise levels were provided *in Chapter 7: Air Quality* and *Chapter 9: Noise and Vibration* respectively. No significant level of noise has been encountered during the baseline studies as described in *Chapter 9: Noise and Vibration.* No significant noise level has been identified in any of the VECs identified.

17.2.3.3 Water

Examination of hydrological, hydrogeological, and water quality components associated with the Project was provided in Chapter 5: Water Quality, Hydrology, and Hydrogeology. Accordingly, it is known that the drinking and utility water needs of Sivas Province are met by 69% underground and 31% surface water resources. Groundwater is supplied by wells and drainage in Tavra Valley, while surface water is sourced from the 4 Eylül Dam. Moreover, the Gürün District Directorate of Agriculture and Forestry reports that settlements in the Project area have water supply networks and infrastructure, and unlicensed groundwater allocation is not allowed by the State Hydraulic Works in Sivas Province meaning that no significant pressure on groundwater bodies is anticipated due to Project implementation.

The Sivas Province Environmental Status Report indicates no pollution stress on water resources due to domestic wastewater or industrial wastewater. However, irregular waste storage and disposal areas may affect surface and groundwater. The Provincial Directorate of Agriculture and Forestry conducts water quality measurements to assess nitrate levels of surface and groundwater resources, but no major stress is found around the Project area.

The ESIA Study conducted groundwater sampling at Çiçekyurt Village, analysing tap water samples from drinking foundations. The results were compared with the Regulation on Water for Human Consumption and WHO Guidelines for Drinking-water Quality: Fourth Edition. All parameters were within Project standards, except for Chloride levels. High Chloride concentrations led to changes in water and beverage taste, but no health-related issues were mentioned in the WHO Guidelines for Drinking-water Quality: Fourth Edition. The analysis results are presented in Table 5.4. of Chapter 5: Water Quality, Hydrology, and Hydrogeology.

17.2.3.4 Quality of Landscape & Visual

Examination on landscape and visual was provided *in Chapter 10: Landscape and Visual* in detail. Accordingly, no significant environmental driver on landscape and visual was identified. In addition, no grievance regarding the landscape and visual has been raised from the public so far.

17.2.3.5 Biodiversity related VECs

Baseline information regarding migratory flyways, bird and bats species associated with the Project was provided in detail in *Chapter 12: Biodiversity.* The project is not located on known major or minor migratory routes of large soaring species between Eurasia and Africa. The region is not well studied with regards to bats, however suitable habitat in the forms of caves and canyon walls is available within the AoI. The AoI is also characterized by endemic flora species. Threatened fauna of conservation significance was also identified.

17.2.3.6 Cultural Heritage - Unregistered Cultural Heritage Sites

Examination of cultural heritage was provided in *Chapter 16: Cultural Heritage* in detail. Two cultural heritage assets (Behram and Kaletepe Archaeological Sites) within the Project licence boundaries have been encountered during the cultural heritage impact assessment studies.

Some stone architectural remains belonging to a modern pastoral settlement have been observed in the Behram archaeological area. There is a spring in the southwest of the

encountered area. Ceramic sherds from the Medieval period were observed on the surface of the archaeological site.

Kaletepe archaeological site was categorised as a "potential archaeological asset" using the remote sensing method (via Google Earth and the review of the 1/25000 scaled topographic maps) in the 1st round of field survey studies for the Project. The area was scanned and determined as an "archaeological site" (a settlement mound, Huyuk) during the second round of field survey studies. Some foundation traces and ceramic sherds (belonging to the Early Bronze Age and Iron Age) have been observed on the surface of the site during the field survey studies.

These cultural assets are unregistered archaeological sites located within the Project License Area where there will be no turbines and no construction activities planned. If additional electricity transmission lines, site roads, switchyards, or similar project facilities are needed under the expansion plan of the Project in the near future, the archaeological site may be at risk from the construction effects of these additional facilities.

17.2.3.7 Socio-Economic Environment related VECs

The social impact assessment of the Project was provided in *Chapter 13: Social Environment* in detail. The Project is estimated to have some potential adverse impacts related to land use and livelihood sources.

With the projects both planned and in the operation phase, public lands registered to the treasury and used for pasturage in the region will be and has been utilised. Projects such as WPP, ETL, and clay quarries involve different land uses. Some projects, like ETL, have a linear footprint, while others, such as WPP and clay quarries, cover a wider area.

The land transactions for the Project have been carried out by reclassifying public lands designated as pastures. Private lands also will be used for the access road and temporary mobilization facility. Within the scope of the Project, transaction will be carried out on several private lands. However, the main impact of land acquisition will occur through the limitation of pasture areas, which are public land. Nearby energy projects have completed their land transactions and are now operational, also using the pasture lands in Gürün villages. During the operation phase, wind turbines do not significantly impact animal grazing activities, but construction work does particularly restrict grazing animals nearby of the construction site.

The opinions of the Project affected community members regarding the Project are reflected in *Chapter 18: Stakeholder Engagement, Information Disclosure and Consultation.* Within the scope of the stakeholder engagement, it was observed that the local community members have some concerns and expectations regarding the Project. Main concerns raised by the mukhtars are related to the inadequate quality of the roads which cause transport disruptions, especially in winter and bad weather conditions. Some mukhtars stated that the quality of the water supply network and the waterpipes is in a poor condition. In winter seasons, the residents face some problems in accessing to water since bad weather conditions result in waterpipes' bursting or freezing.

The positive social impacts of the Project are assessed to be on local infrastructural capacity improvements such as improving the access roads of the settlements. In addition, it can be considered to contribute economically to the surrounding businesses with the products and services to be allocated locally. Employment is also assessed as one of the positive impacts of the planned investments in the region. Unemployed local community members may benefit from the employment opportunities created by the projects.

17.2.3.8 Community Health & Safety related VECs

Examination on community health and safety was provided *in Chapter 15: Community Health & Safety* in detail. In addition, there is the Kangal-Kalburçayırı Coal Mining Facilitywhich acts as an environmental driver regarding community health and safety concerns. Other than, that as there are no major industrial / commercial activities being carried out nearby the VECs identified no existing significant risk on traffic safety or in fire safety was determined.

17.2.4 Step 4: Assessment Cumulative Impacts on VECs

Step 4 of the CIA process is a pivotal stage in the evaluation of the Project. The primary focus is on assessing the cumulative impacts on VECs resulting from various past, present, and foreseeable future developments. Step 4 has three main objectives:

Identify Potential Impacts and Risks: Systematically recognize potential environmental and social impacts and risks associated with the cumulative impacts on VECs.

Assess Expected Impacts: Evaluate the anticipated changes in the condition of VECs, emphasizing viability and sustainability as key indicators.

Identify Interaction of Impacts: Understand the potential additive, countervailing, masking, or synergistic impacts arising from the interaction of various impacts and risks.

Within the scope of the CIA carried out for Pelit WPP Project, a variety of methods were used to assess the foreseen impacts on VECs. These methods encompass spatial analysis using geographical information systems (GIS).

17.2.4.1 Land Loss

It shall be noted the majority of the environmental drivers in question are the wind power plants which are expected to occupy relatively small areas. Nevertheless, the planned quarries described in Section 17.2.2, quarries' license areas are occupying large lands. Even though, currently it is not planned to use all the license area within the near future, it can be said that the majority of these land can be occupied by these mining operations within the foreseeable future. Total area occupied by these license areas are stated below:

- First Iron Mine License Area (License No: 201600083): 1694 ha
- Polat Iron License Area (License No: 202200134): 1164 ha
- DSI -Access No:3413529 Clay Quarry: 10 ha
- Kangal-Kalburçayırı Coal Mining Quarries:
  - License No 53318 = 8048 ha
  - License No 20058878 = 1932 ha
  - License No 74005 = 1950 ha
  - License No 20058554 = 1733 ha
  - License No 20058498 = 1950 ha
  - License No 61156 = 1955 ha
  - License No 4558 = 402 ha
  - License No 48142 = 237 ha
- **Total=21075 hectares**

To identify the severity of the possible impact on land within the cumulative AoI, the license areas footprint on Corine 2018 LULC database was examined. It can be said that the Kalburçayırı License Area is expected to have the most significant impact on the land loss as it is expected to occupy largest amount of land and it has an impact on urban, agricultural,

pasture and natural areas. Nevertheless, Polat Mining and First Mining license areas are expected to have a moderate impact on pasture lands (included the Sparsely vegetated areas where it is known that local people are using during their livestock activities) and low impact on agricultural areas. Finally, the DSİ Clay Quarry License area will not have an impact on pasture lands and low impact on agricultural areas (Table 17.4).

Table 17.4: Corine 2018 LULC Evaluation of the Mining License Areas

Corine 2018 LULC	Kalburçayırı License Area	Polat Mining License Area	First Mining License Area	DSİ Clay Quarry License Area
112 - Discontinuous urban fabric	24.44	-	-	-
121 - Industrial or commercial units	249.43	-	-	-
131 - Mineral extraction sites	1,712.69	-	-	-
211 - Non-irrigated arable land	4,085.35	-	273.96	10
212 - Permanently irrigated land	599.00	-	-	-
231 - Pastures	768.29	-	133.89	-
242 - Complex cultivation patterns	410.60	-	44.50	-
243 - Land principally occupied by agriculture	1,197.08	74.66	150.63	-
321 - Natural grasslands	1,246.39	-	-	-
324 - Transitional woodland-shrub	7.64	-	-	-
332 - Bare rocks	60.89	-	-	-
333 - Sparsely vegetated areas	3,555.48	1,089.62	1,090.52	-

17.2.4.2 Water

Due to the nature of the WPP construction and operation no significant impact is anticipated. However, WPPs can impact surface water and groundwater in several different ways, including the use of water resources and changes in water quality. For the most part, wind energy development does not require much water, except during the construction phase and, to a lesser extent, during decommissioning. These water uses are temporary, and during the operation phase, water use would be minimal.

Additionally, if appropriate mitigation measures are implemented during the construction phase, potential impacts to water during operation phase would be limited to the degradation of water quality as a result of accidental spills or vehicle traffic.

In this context, there will be no significant effects on surface water and groundwater quality caused by the Project after the implementation of appropriate mitigation measures.

17.2.4.3 Air emissions & Noise

Due to the nature of the WPP construction and operation no significant impact is anticipated. This spatial separation serves as a crucial mitigating factor, minimizing the likelihood of adverse effects on the wind power plant and its surroundings. Nevertheless, the mining activities and thermal power plants are expected to have a significant impact regarding air emissions and noise levels.

Furthermore, community engagement and feedback play a vital role in assessing the cumulative impact of industrial activities. In this case, it is noteworthy that no grievances related to air emissions or odor issues have been raised by the local residents in the vicinity of VECs identified. It shall be noted that, the National EIA processes of the mentioned WPPs are still

ongoing; thus, the air quality and noise assessments of these facilities are not known yet. Still, a significant noise generation can be expected as there are many WPPs are planned.

17.2.4.4 Landscape & Visual

The cumulative impact of planned and existing wind turbines along with the ones to be installed within the scope of the Pelit WPP Project has been assessed. The methodology employed in this study aimed to assess the visibility and visual impact of landscape features within the designated study area using GIS-based viewshed analysis. Below outlines the systematic approach, data collection, pre-processing steps, and the application of the QGIS-3 Viewshed Plugin for deriving insightful results.

Data Collection

Spatial data formed the foundation of this analysis. The primary datasets included a high-resolution digital elevation model (DEM) obtained from Shuttle Radar Topography Mission (SRTM)[201], wind turbine locations from satellite images and EIA Files.

To ensure data compatibility and accuracy, pre-processing steps were implemented. This involved resampling the DEM to a consistent resolution 27.7835x27.7835-pixel size, clipping datasets to the study area boundaries, and reprojecting layers to a common coordinate reference system WGS 1984, UTM Zone 37N.

Data cleaning procedures were also applied to address any anomalies, artifacts, or missing values within the datasets. These steps were crucial for maintaining the integrity of the analysis.

Viewshed Analysis Tool

The QGIS3 Viewshed Plugin was chosen for its versatility, ease of integration with QGIS, and robust functionality in performing viewshed analysis.

Key parameters influencing the viewshed analysis were carefully chosen to align with the study objectives and the characteristics of the study area. These included the observer height, target height, and visibility threshold. Within the scope of the viewshed analysis observers were defined as the wind turbines and electricity transmission towers. A visual representation of viewshed analysis is given below.

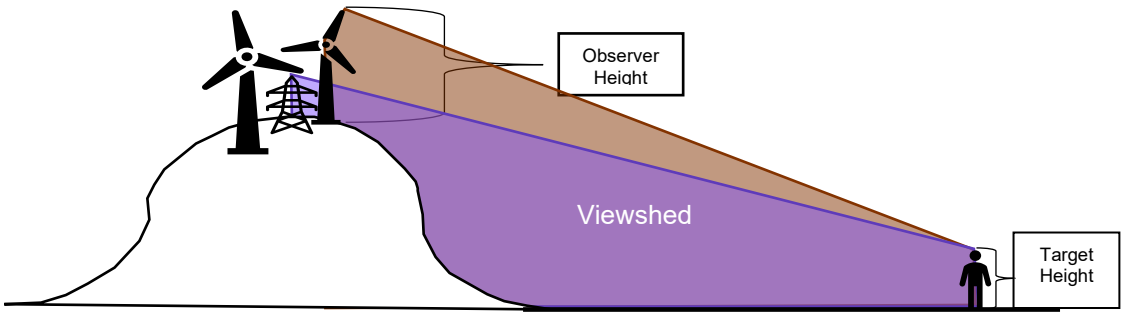


Figure 17.4: Viewshed Analysis

Even though, tip height of the wind turbines was changing turbine to turbine, the tip height of all turbines was assumed as 200 meters considering the turbine foundations to be on the safe side.

Figure 17.5 shows that it is possible for both at least one of the identified turbines be visible at the any settlement in Cumulative AoI. It is highly possible to observe one to seven turbines at the VECs identified. Nevertheless, as it can be seen from Figure 17.5 only Pelit WPP turbines can be

[201] URL: https://www.earthdata.nasa.gov/sensors/srtm accessed on 03 July 2024

observed from the identified VECs. Thus, it can be said that limited interaction of the impact on the visibility of the wind turbines is in question.

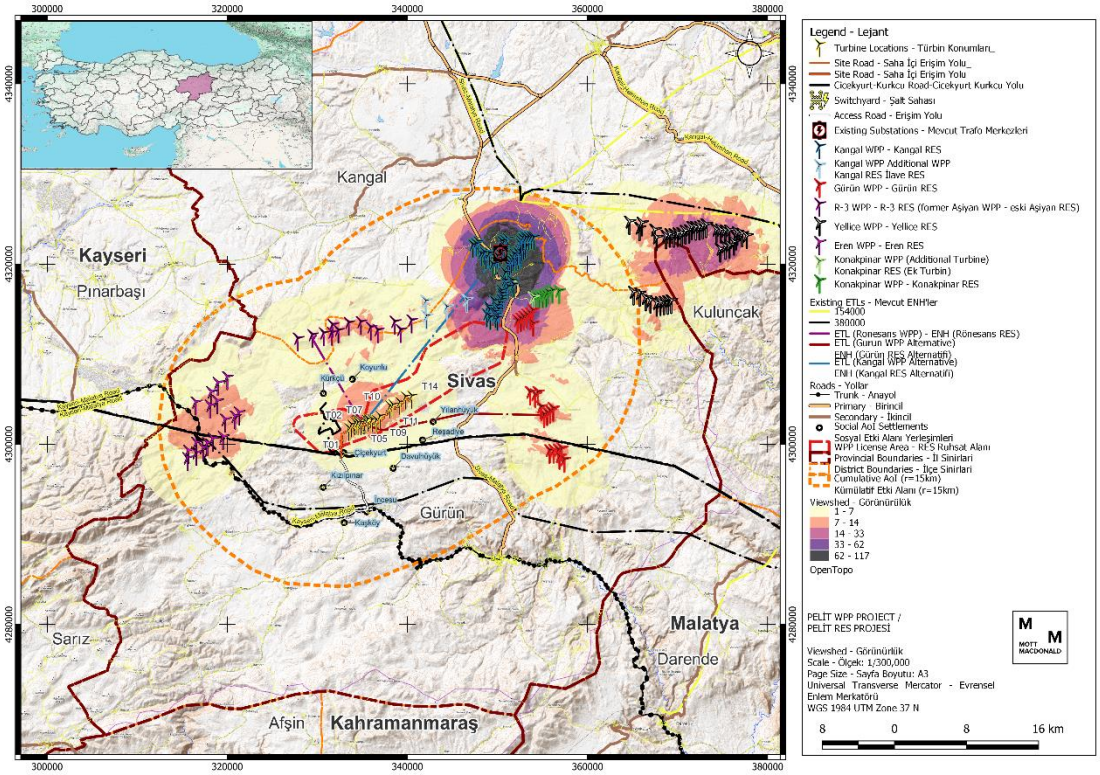


Figure 17.5: Cumulative Viewshed Analysis

In addition, as described in Section 17.2.2, there are several mining operations in question within the Cumulative AoI. Mining operations can have a significant impact on the landscape, often leading to alterations in the topography and natural features of an area. The process of extracting minerals involves large-scale excavation, removal of vegetation, and displacement of soil and rock, which can result in the creation of open pits, waste dumps, and tailings ponds. These changes can disrupt local ecosystems, causing habitat loss for flora and fauna, and potentially leading to soil erosion and water contamination. The visual scarring of the landscape is often irreversible, transforming previously undisturbed natural environments into barren and industrial-looking sites.

The visibility of mining operations also poses a considerable impact. Large-scale mining activities can dominate the visual horizon with machinery, dust, and altered landforms, detracting from the natural beauty and aesthetic value of the area. Moreover, the presence of mining infrastructure, such as haul roads, processing facilities, and tailing storage, can contribute to light pollution, affecting the night sky visibility and potentially disrupting the natural behaviors of wildlife. Overall, the visual impacts of mining can extend far beyond the immediate vicinity of the operations, influencing perceptions and experiences of the broader landscape.

Considering the large footprints of the quarries in question and their close proximity to the First Mining, Polat Mining and DSI mining quarries to the Yılanhüyük and Reşadiye settlements, the interaction is in question and the impact is expected to be major.

17.2.4.5 Biodiversity

Since the footprints of existing Projects are small, and the Projects do not significantly alter the connectivity of the natural habitats, habitat loss and fragmentation affects in the Cumulative AoI are not considered major.

The Cumulative AoI comprises multiple WPPs which emphasizes avoidance, barrier, collision and electrocution impact for the area. While the AoI does not constitute a significant known major and minor migratory route neither for birds not bats, and the ecological productivity is low to sustain year-round activity, the AoI is still significant for high mountain and steppe raptors and other large bodied species which are collision prone. At the regional scale, the pace and level of development is not considered very significant.

Collision risk is not part of National EIA considerations and collision risk estimations, if undertaken, are not publicly disclosed except during international financing requirements. A quantitative assessment of regional collision risk is impossible due to lack of standardized publicly available collision risk data, therefore only a qualitative evaluation can be undertaken. As detailed in Chapter 12, regional mortality baseline was provided for birds and bats on a per turbine per year basis.

Gauld et al (2021) carried out a flyway level assessment of mortality vulnerability of large bodied species due to transmission lines and WPPs, the results of which (combined vulnerability to WPP and transmission lines) was overlapped with the Cumulative Project AoI[202]. Majority of the Cumulative Project AoI is characterized by no data grids. The reason for this is the low level of migratory activity in the area.

Overall, the cumulative impact of wind energy development at the regional level in terms of flyway integrity is expected to be moderate due to presence of threatened flora and fauna species.

17.2.4.6 Cultural Heritage

As there are no expected future developments in the near vicinity of identified unregistered cultural heritage sites other than the Project, no significant cumulative impacts on the cultural heritage sites are expected.

17.2.4.7 Socio-Economic Environment

Considering the projects that are still in the National EIA stage or have received EIA approval but have not begun construction, it is evident that a significant portion of pastureland falls within the cumulative impact area of the Project. This scenario poses a substantial land use-based livelihood impact on the region, which is known for its abundant and alternative pasture lands. The Project is estimated to cause economic displacement especially for the users of the utilized private lands. Also, the cumulative effect of reduced pasture lands results in a significant negative impact.

Additionally, the construction of access roads for the Project and other projects has affected some agricultural areas. Land acquisition for these roads has sometimes involved the reallocation of agricultural lands, leading to temporary or permanent loss of the land. This has disrupted farming activities and access to agricultural fields, further contributing to the

[202] Gauld, J., Silva, J., Atkinson, P., Record, P., Acácio, M., Arkumarev, V., Blas, J., Bouten, W., Burton, N., Catry, I., Champagnon, J., Clewley, G., Dagys, M., Duriez, O., Exo, K., Fiedler, W., Flack, A., Friedemann, G., Fritz, J., . . . Franco, A. (2022). Hotspots in the grid: Avian sensitivity and vulnerability to collision risk from energy infrastructure interactions in Europe and North Africa. Journal of Applied Ecology, 59(6), 1496–1512. https://doi.org/10.1111/1365-2664.14160

cumulative impact on local livelihoods. The cumulative effect of multiple projects has thus imposed additional pressure on both animal grazing and agricultural resources in the region.

There is usually a water supply network or a spring water in the villages. In some of the villages, mukhtars and the residents stated that they have difficulties in accessing water due to various reasons such as old pipes and cold weather. Construction activities may cause disruption in the daily lives of the local community members by causing temporary water shortages or contamination of natural spring water.

In most of the village, it was stated by the mukhtars and the residents that the roads providing access to the villages and between villages are inadequate and of poor quality. PAPs stated that the existing roads create various problems for vehicles, and that the roads to be built will facilitate the transportation of the residents of the Project affected villages. Overall, the roads planned to be constructed and improved will strengthen the logistics infrastructure of the region in general, in addition to agricultural transport. Timeline of the Project and other investments will be considered to prevent any risk related to the traffic congestion.

In terms of recruitment, employment opportunities can be provided to people residing in the surrounding villages and actively looking for work provided that they meet the necessary technical and legal requirements of the work. Positive impacts are also related to the infrastructural developments (i.e., improvements on the road quality, water supply network), improvements on the social facilities in the nearby villages (i.e., school, social centre for weddings and funerals) and social projects (i.e., trainings and scholarship opportunities) of the Project Company to be developed in the future can create positive outcomes in the social environment.

17.2.4.8 Community Health & Safety

Usually, wind turbines are situated far away from houses, highways, and other buildings. However, due to the flat topography of the Project Area and its close vicinity, the Project and other environmental drivers are situated nearby settlements.

National regulations stipulate that when wind farms are established in residential areas, specific distances must be kept in respect to shadow flicker and acoustic noise emission. This means that there should not be any risks related to ice being thrown from wind turbines. The safety of people or things nearby the turbine could be in jeopardy if ice chunks broke off and flew vast distances from the turbine's components, which are typically the blades. However, although the distance between turbines and settlements is not too far, there has not been an ice problem in the region during the operation of the Project. The existing turbines have warning signs for ice throw and wire barriers to prevent uncontrolled entrance under them and also the planned turbined will have the warning signs and wire barriers. Hence, cumulative impact for ice throw can be evaluated as minor.

Moreover, as majority of these WPPs are being planned at the moment it can be assumed that the construction can be started at similar times which can result increased traffic risk due to construction machinery and abnormal load transportation to the area. Thus, the Traffic risk is considered as high.

As a result of both development and changes in land cover and changes in precipitation events, surface runoff flooding (pluvial flooding) may increase. Depending on projected changes in extreme precipitation events, sudden downpours and flash floods may become more frequent (see *Chapter 8: Climate and GHGs* for more details on projected climate conditions). In addition, warmer temperatures may increase the drying of soils and their inability to absorb rainfall, thereby increasing the potential for surface runoff and the risk of flash floods. The community health and safety could be at risk from all these effects of climate change. However, the risk is

considered to be negligible because the relevant climate variables show a slight change from the baseline in the worst case.

In addition, the mine quarries can pose several community health and safety concerns to local communities. These may include air and water pollution due to the release of particulate matter, heavy metals, and other contaminants from mining activities. Dust from blasting and transportation can cause respiratory issues, while contaminated water can affect local water supplies and agricultural land. Noise pollution from machinery and blasting can disrupt daily life and lead to hearing problems. Additionally, the influx of workers can strain local infrastructure and healthcare services, and the increased traffic can raise the risk of accidents. Ensuring adequate safety measures, environmental controls, and community engagement is crucial to mitigate these impacts.

Interaction among the determined environmental drivers on the community health and safety related impact is expected for the ice throw risk and traffic related impacts (As the mine areas are expected to use Sivas-Malatya Road more often; whereas the Project is planned to use Kayseri Malatya Road to access the Project Area.). No impact is foreseen on the aviation areas as there are too far away as described in Chapter 15.

17.2.5 Step 5: Assess Significance of Predicted Cumulative Impacts

Step 5 of the CIA process is a critical phase that involves determining the significance of the predicted cumulative impacts on VECs. This step aims to provide a comprehensive understanding of the magnitude and implications of the identified impacts in the context of past, present, and future actions. The key objectives of Step 5 are as follows:

Define Appropriate "Thresholds" and Indicators: Establish relevant thresholds and indicators to gauge the impact and risk magnitude concerning the VECs.

Determine Impact and Risk Magnitude: Evaluate the magnitude of impacts and associated risks considering the cumulative impacts of various developments.

Identify Trade-offs: Identify and analyse any potential trade-offs between the proposed action and the potential impacts on VECs.

Within this scope, summary of the cumulative impacts is provided in Table 17.5.

Table 17.5: Cumulative Impact Assessment Summary

Area of Concern	VEC	Specified VECs	Pelit WPP	Kangal Wind Power Plant and Extension	R3-Sivas-1-2 Wind Power Plant	Eren Wind Power Plant	Konakpinar Wind Power Plant	Yellice Wind Power Plant	First Iron Mine, Iron Ore Enrichment Plant and Mine Waste Storage Area	Polat Iron Furnace with Crushing-Screening and Enrichment Facility and Mine Waste Storage	DSI -Access No:3413529 Clay Quarry	Kangal TPP and Kangal-Kalburçayırı Coal Mining	Kayseri-Keban 2 ETL
Land Assets	Agriculture	Agricultural Areas	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Low	Low	Low	Major	Negligible
	Livestock	Pasturelands	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate	Major	Negligible
Water	Fırat-Dicle Basin Water Quality	Surface resources	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Low to Moderate	Negligible	Low to Moderate	Low to Moderate	Negligible
		Groundwater resources	Low	Negligible to Low	Negligible to Low	Negligible to Low	Negligible to Low	Negligible to Low	Low to Moderate	Negligible	Low to Moderate	Low to Moderate	Negligible
Air emissions, noise	Air quality and noise levels in settlements nearby the Project Area	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Low	Moderate	Low
Landscape & Visual	Quality of landscape and visual	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages	Low	Low	Low	Low	Low	Low	Moderate	Moderate	Low	Moderate	Low
Biodiversity	Critical Habitat	Endemic, rare and threatened flora species Collision prone, migratory and threatened bat species Breeding and wintering bird species of conservation concern Endemic and threatened terrestrial fauna species	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Natural Habitats	E1.2-Perennial calcareous grassland and basic steppes H3.6-Weathered rock and outcrop habitats	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Cultural Heritage	Unregistered Cultural Heritage Sites	Behram Archaeological Site and Kaletepe Archaeological Site	Low	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Socio-Economic Environment	Land Acquisition and Economic Displacement	Local community members who use public pasture lands for animal husbandry activities Vulnerable groups who may disproportionately be affected from the land acquisition process of the new investments in the region	Moderate	Low	Low	Moderate	Low	Negligible	Moderate	Moderate	Moderate	Negligible	Negligible
	Employment	Unemployed local community members who will benefit from the employment opportunities	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Area of Concern	VEC	Specified VECs	Pelit WPP	Kangal Wind Power Plant and Extension	R3-Sivas-1-2 Wind Power Plant	Eren Wind Power Plant	Konakpinar Wind Power Plant	Yellice Wind Power Plant	First Iron Mine, Iron Ore Enrichment Plant and Mine Waste Storage Area	Polat Iron Furnace with Crushing-Screening and Enrichment Facility and Mine Waste Storage	DSI -Access No:3413529 Clay Quarry	Kangal TPP and Kangal-Kalburçayırı Coal Mining	Kayseri-Keban 2 ETL
	Infrastructural Services	Local community members that may be affected from the construction activities in accessing to the infrastructural services	Low	Low	Low	Low	Low	Negligible	Low	Low	Low	Negligible	Negligible
Community Health & Safety	Safety from blade and ice throw and shadow flicker risk and flooding	Çiçekyurt, Kürkçü, Davulhöyük, Koyunlu, Reşadiye, Yılanhöyük, İncesu, Kaşköy, and Kızılpınar Villages	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Low to Moderate	Moderate	Moderate	Low to Moderate	Major	NA
	Aviation	Sivas Airport Kayseri Airport	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	NA	NA	NA	NA	NA
	Traffic Safety	Çiçekyurt Village Road Kayseri-Malatya Road	Low	Low	Low	Low	Low	Low	Low to Moderate	Low to Moderate	Low	Major	NA

The cumulative impact assessment criteria can vary depending on the specific context and objectives of the assessment. Here are the criteria to considered during the cumulative impact assessment:

- ***Number of Projects:*** Assess the cumulative impact based on the total number of projects in the area. This criterion considers the additive effect of multiple projects on environmental and social factors.
- ***Magnitude of Cumulative Impact:*** Evaluate the cumulative impact based on the combined magnitude of impacts from all projects. This criterion takes into account the severity and extent of environmental changes resulting from multiple developments.
- ***Interaction of Impacts:*** Examine how the impacts of different projects interact with each other. This criterion focuses on identifying additive, countervailing, masking, or synergistic effects resulting from the combined influence of multiple developments.
- ***Spatial Distribution:*** Analyse the spatial distribution of cumulative impacts to identify areas of concentrated impact and potential hotspots where multiple stressors coincide.
- ***Temporal Dynamics:*** Assess how cumulative impacts evolve over time, considering both short-term and long-term effects on environmental and social systems.
- ***Stakeholder Perspectives:*** Incorporate stakeholder perspectives and values into the assessment criteria to ensure that the concerns and priorities of affected communities are adequately addressed.

By considering these criteria in the cumulative impact assessment process, significance of each concern on VECs was assessed as below:

- Cumulative impact on land loss for agricultural lands will be low and cumulative impact on pasture lands is moderate as majority of majority of the land to be occupied is pasture lands.
- Similarly, the cumulative impact on air emissions will also be low as the identified due to the nature of the WPP construction. Nevertheless, the impact on Reşadiye and Yılanhüyük can be considered as moderate as they are close to the mining areas as well.
- Landscape & visual may not be affected cumulatively by the environmental drivers as the limited interaction is in question. Nevertheless, the landscape impact on Reşadiye and Yılanhüyük settlements are expected to be moderate as they are close to the mining areas as well.
- Cumulative impact on biodiversity for large soaring bird species and bats will be moderate since the Project is not on a known migration route, but threatened breeding and wintering species are present as well as presence of endemic and threatened flora, but the Cumulative AoI does not pose major pressure on habitats and species.
- Cumulative impact on cultural heritage is negligible since there is no other project or investment in the cumulative AoI having impact on the VECs.
- Timeline of the new investments will be considered to prevent any risks related to accessing infrastructural services.
- There is no significant risk of an interaction of ice throw and traffic.
- Cumulative impacts on socio-economic environment and community health and safety are also low to moderate as no major concern or risk have been identified except the potential impacts related to the land transactions and infrastructural services.

The following mitigation measures aim to minimize disruptions to pasture and agricultural lands, support local communities, and ensure sustainable land use:

- Design project layouts to minimize land use, such as using existing roads for access and placing infrastructure in less sensitive areas.

- Develop integrated land use plans that consider the needs of different projects while minimizing impacts on pasture and agricultural lands.
- Implement rehabilitation programs such as CDP for areas disturbed by construction, including restoring soil quality and the pasture qualities of lands to regain original use as much as possible. Provide fair compensation to affected land users and support programs for alternative livelihoods, ensuring that local communities are not economically disadvantaged.
- Plan construction activities to avoid critical periods for animal grazing and agricultural activities, such as planting and harvesting seasons, to reduce disruptions.
- Involve local communities in the planning and decision-making processes to ensure their concerns are addressed and to enhance project acceptance in line with the SEP.
- Establish ongoing monitoring of land use impacts and implement adaptive management strategies to address any unforeseen issues promptly.

17.2.6 Step 6: Management of Cumulative Impacts – Design and Implementation

Step 6 marks the culmination of the CIA process, focusing on the design and implementation of management strategies. This phase is crucial for addressing the identified significant cumulative impacts on VECs and ensuring a proactive approach to environmental and social sustainability. The primary objectives of Step 6 are outlined as follows:

Use the Mitigation Hierarchy: Apply the mitigation hierarchy to address cumulative impacts on selected VECs, emphasizing avoidance, minimization, and mitigation.

Design Effective Management Strategies: Develop robust management strategies to tackle significant cumulative impacts, considering the context of the developments that contribute to these impacts.

Engage Relevant Parties: Facilitate collaboration or coordination with other stakeholders needed for effective impact management, ensuring a collective approach to address cumulative impacts.

Propose Mitigation and Monitoring Programs: Put forth detailed mitigation and monitoring programs tailored to the specific needs of the cumulative impacts identified.

Manage Uncertainties with Informed Adaptive Management: Implement adaptive management strategies to address uncertainties and enhance the efficacy of the proposed mitigation measures.

Acknowledging that cumulative impacts often result from the actions of multiple stakeholders, it is emphasized that the responsibility for managing these impacts is collective. Thus, addressing and mitigating each cumulative impact would require a pro-active approach and good collaboration with the relevant stakeholders. In addition, the importance of governments in establishing Cumulative Impact Assessment frameworks needs to be underscored as well. With this regard, management measures for the foreseen cumulative impacts are presented below.

This ESIA Report's chapters separately define mitigation strategies at the project level. Collaborative participation in regional management strategies will be required when project-specific mitigation measures prove insufficient and project mitigation alone is unable to avert an undesirable cumulative impact (IFC, August 2013). For biodiversity values of significance such as bird species that trigger Critical Habitat, management measures are defined in the respective chapter. The IFC suggests taking the following particular steps, which might be necessary to manage cumulative impacts in an efficient manner:

- Project mitigation techniques, such as adaptive management techniques, are used to reduce cumulative impacts.
- Taking part in regional monitoring programs collaborations to evaluate the effectiveness of management initiatives and the realized cumulative impacts.
- The turbine transportation will be carried out with collaboration of all WPPs and after informant local communities and the relevant Directorate of Highways.
- To mitigate the ice throw risk, the management of all WPPs will be in coordination at all times and local communities will be engaged in this regard.

18 Stakeholder Engagement, Information Disclosure and Consultation

18.1 Introduction

This Chapter of the Draft ESIA Report provides information about the Project stakeholders and previously conducted specific stakeholder engagement, information disclosure and consultation activities. In addition, it describes the Project's grievance mechanism to be established and the future stakeholder engagement activities that will be conducted within the scope of the Project.

18.2 Methodology

18.2.1 Overview

Continuous, open, and transparent stakeholder engagement is an essential aspect in projects to ensure the project's sustainability, improved quality, and better implementation. The objective of the stakeholder engagement is successfully managing the risks and impacts on communities, people, groups, businesses, and any other interested parties affected by projects. Robust stakeholder identification and stakeholder mapping are the very first and significant steps of an effective stakeholder engagement.

Stakeholder engagement provides a mutual communication line between the Project Company and the Project stakeholders, which will continue throughout the Project lifecycle including pre-construction, construction, and operation phases. Different phases of the Project can necessitate varying engagement and consultation activities. The Project Company is responsible for establishing a platform that enables continuous communication and consultation with all Project stakeholders.

As the international standards and requirements (particularly IFC PS1, EBRD PR10, and EP IV Principles 5 and 6 necessitate, stakeholder consultation and engagement involve the following aspects:

- Identification and analysis of all potentially affected individuals, groups, communities, organizations, vulnerable/disadvantaged individuals, and groups that will be considered as stakeholders,
- Planning the steps for the way stakeholder engagement, information disclosure and meaningful consultation with stakeholders will be held,
- Identification of the issues that remain as a risk or adverse impact for the Project or the stakeholders,
- Formation of a good understanding of the Project for stakeholders,
- Addressing a grievance mechanism, which is free of manipulation, coercion, and intimidation for long-term communication between the Project and the stakeholders,
- Responding to grievances in a timely manner through the grievance mechanism, and
- Regularly informing the stakeholders about the Project.

To ensure that stakeholder engagement processes are successful and effective, stakeholder engagement should be initiated earlier in the projects. In line with the IFC PS1, EBRD PR10, and EP IV Principles 5 and 6, stakeholder engagement has started during the National EIA process of the Project through engagement with the key project stakeholders. Stakeholder engagement will continue throughout the Project lifecycle. Please see Section 18.4.2 for past

stakeholder engagement activities. Stakeholder engagement will continue throughout the Project lifecycle.

18.2.2 Applicable Guidelines and Standards

18.2.2.1 National Requirements

The Turkish EIA Regulation (OG Date/Number: 29.07.2022/31907) includes a number of requirements regarding information disclosure and stakeholder participation.

During the scoping phase of the projects, stakeholder engagement within the scope of the National EIA process starts with the establishment of a commission that involves representatives from related governmental bodies and that is responsible for review and assessment of the Project.

Establishment of the commission is followed by the public participation meeting. Organizing a public participation meeting is legally obligatory as per the regulation. The aim of the public participation meeting is to ensure that the public and interested parties in the project (i.e., local community members, governmental bodies, non-governmental organizations) are informed about the project and have an opportunity to raise their opinions, suggestions and/or concerns regarding the project. It is crucial that the local community members who are assessed to be most affected by the project are enabled to participate in this meeting. Therefore, organizing the meeting that is accessible to the local community members to the most possible extent is also underlined within the regulation.

The issues reported by the participants of the meeting are documented in the official meeting minutes to be considered and addressed in the National EIA document. In addition, the institutions authorized by the Ministry of Environment, Urbanization and Climate Change (MoEUCC) prepare a SEP in order to inform the public about the project and its impacts, and to facilitate receiving the opinions and suggestions of the public regarding the project. However, this regulation is effective as of July 2022 and the public participation meeting of the Project subject to the EIA process was held in December 2017. Therefore, it is exempt from the requirement to prepare a SEP within the scope of the EIA process.

Once the EIA document is submitted to the MoEUCC for review, the MoEUCC and the related provincial directorates announce to the public that the review process of the established commission has started, and the draft EIA document is also open to public review and comments for 30 days. Appropriate communication channels (i.e., newspapers, noticeboards, and the Internet) are used for the announcement.

Following the review of the commission and the public, the final draft of the EIA document is disclosed by the MoEUCC and the related provincial directorates for 10 days through announcement boards and the Internet. By considering the evaluations of the committee and public views, the MoEUCC gives the “EIA Affirmative” or “EIA Negative” decision regarding the project. EIA reports that receive a “EIA negative” decision is obliged to be re-disclosed to public review and relevant stakeholders (same methods as explained above). No additional public participation meeting is required.

At the final stage, the decision of the MoEUCC is also disclosed to the Project stakeholders by using appropriate means of communication.

National legislation related to consultation, information disclosure, stakeholder engagement and grievance mechanism also includes Law on Right to Information (No. 4982), Law on Preservation of Personal Data (No. 6698), Law on Use of the Right to Petition (No. 3071), and Regulation on the Principles and Procedures for the Enforcement of the Law on the Right to Information.

18.2.2.2 International Requirements

The stakeholder engagement and consultation requirements of the Project are assessed and planned by considering the following international standards:

- IFC's Performance Standards on Environmental and Social Sustainability (2012)
  - Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts: PS 1 emphasizes on the importance of: (i) an integrated assessment to identify the environmental and social impacts, risks and opportunities of the Project; (ii) effective community and stakeholder engagement through disclosure of Project-related information and consultation with local communities on matters that directly affect them; and (iii) the Client's management of social and environmental performance throughout the life of the Project through management programs, monitoring, and review.
  - Performance Standard 2 – Labour and Working Conditions: In accordance with Performance Standard 2, efforts to promote economic growth by generating employment and income should safeguard the fundamental rights of employees. Employees are a valuable asset to their companies, and a robust relationship between employees and management is essential for the company's sustainability. The client will establish a grievance mechanism for employees (and workers' organisations) to raise workplace concerns. Information about the grievance mechanism will be provided to employees during recruitment, and the mechanism will be easily accessible to them.
  - Performance Standard 5 – Land Acquisition and Involuntary Resettlement: Decision-making processes related to resettlement and livelihood restoration should include options and alternatives, where applicable. Disclosure of relevant information and participation of Affected Communities and persons will continue during the planning, implementation, monitoring, and evaluation of compensation payments, livelihood restoration activities, and resettlement to achieve outcomes that are consistent with the objectives of the Performance Standard.
- EBRD's Environmental and Social Policy & Performance Requirements (2019)
  - Performance Requirement 1 - Assessment and Management of Environmental and Social Risks and Impacts: PR 1 emphasizes the significance of integrated assessment of the environmental and social impacts and issues associated with the Project and identify the Project's stakeholders and design a plan for engaging with the stakeholders in a meaningful manner to take their views and concerns into consideration in planning, implementing, and operating the Project with reference to the PR10. Mitigation measures defined for the environmental and social impacts will be developed and implemented so that vulnerable people within the scope of the Project are not disproportionately impacted.
  - Performance Requirement 2 – Labour and Working Conditions: As a part of the stakeholder engagement scope of the Project, all Project workers (including Project employees, contractors, subcontractors, suppliers, and their workers) are defined as the internal stakeholders. In line with the PR 2, a grievance mechanism for workers needs to be established and applied in order to enable workers to raise reasonable workplace concerns. The Project Company will inform the workers of the grievance mechanism at the time of hiring and make it easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution. The mechanism should not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.
  - Performance Requirement 5 - Land Acquisition, Restrictions on Land Use and Involuntary Resettlement: During all Project-related land acquisition processes, PR 5 requires

engaging with the PAPs and communities through meaningful consultation, and disclose relevant information throughout the planning, implementation, monitoring and evaluation of land acquisition, and resettlement process including livelihood improvement. The Client should ensure that all groups, including the vulnerable are informed and made aware of their entitlements, rights, opportunities and benefits.

  - Performance Requirement 10 - Information Disclosure and Stakeholder Engagement: PR 10 recognises the significance of a transparent engagement with relevant stakeholders (especially those defined as vulnerable groups within the scope of the Project) and disclose appropriate Project information throughout the lifetime of the Project. Providing an accessible grievance mechanism as a part of the stakeholder engagement is crucial for building strong, constructive, and responsive relationships which are essential for a successful environmental and social impacts management within the Project.

- Equator Principles IV (2020)
  - Principle 5 - Stakeholder Engagement: Principle 5 recognizes that for all Category A and Category B projects, the EPFI will require the client to demonstrate effective stakeholder engagement, as an ongoing process in a structured and culturally appropriate manner, with affected communities, workers and, where relevant, other stakeholders.

    For projects with potentially significant adverse impacts on affected communities, the principle requires performing an informed consultation and participation process. The client is expected to tailor its consultation process to: (i) the risks and impacts of the project; (ii) the project's phase of development; the language preferences of the affected communities; their decision-making processes; and (iii) the needs of disadvantaged and vulnerable groups.
  - Principle 6 - Grievance Mechanism: Principle 6 recognizes that for all Category A and, as appropriate, Category B projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by affected communities and workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the project's environmental and social performance.

18.2.2.3 Applicable Policies and Management Systems of the Project Company

A corporate level SEP, which has been prepared by the Project Company, is in place since August 2023. The Corporate SEP defines the disclosure approach, commitment to meaningful consultation and participation and ongoing reporting to external stakeholders of the Project Company.

The Project Company has also an integrated Quality, Health and Safety, Environment and Energy Management Systems and relevant certifications, which are listed below:

- ISO 9001: 2015 - Quality Management System
- ISO 14001: 2015 - Environmental Management System
- ISO 45001: 2018 - Occupational Health and Safety Management
- ISO 50001: 2018 - Energy Management System
- ISO/IEC 27001: 2013 - Information Security Management System
- ISO 55001 – Asset Management System
- ISO 10002:2018 - Customer Satisfaction
- ICS 27.10 - Wind Turbine Energy Systems Standard Family
- In addition, the Project Company has the following policies, which are disclosed at the website[203]: Social Policy

[203] https://www.borusanenbw.com.tr/

- Quality Policy
- Procurement Policy
- Health, Safety, Environment and Energy Policy
- Human Resources Policy
- Information Security Management Policy

Apart from the above-mentioned policies and management systems, the Project Company have Stakeholder Management and Grievance Mechanism Plan, Community Health and Safety Management Plan, Livelihood Restructuring Management Plan and Land Acquisition and Resettlement Action Plan. In addition, the Corporate Social Responsibility Plan, which covers guidelines for social support for community benefit, facility-based plans and implementation and social management system, is applied at all facilities of the Project Company.

18.3 Stakeholder Identification

18.3.1 Overview

In line with the definitions of international standards, stakeholders are defined as the individuals or groups who are impacted by a project or possess an interest in its outcome. Project's impact may be positive or negative and can be direct or indirect.

The first step of the stakeholder engagement is to identify the Project stakeholders. The aim of this identification is to determine each stakeholder group and define their relation to the Project. It is important to consider their opinions, perspectives, concerns and needs when undertaking a project to ensure successful outcomes.

18.3.2 Project Stakeholders

Identified stakeholders of the Project are categorized as external stakeholders (including governmental and non-governmental bodies, mukhtars/residents/local communities, vulnerable/ disadvantaged groups, media and universities) and internal stakeholders (all Project staff, including contractors and subcontractors and their employees) which are given in Table 18.1 through Table 18.4: below. All stakeholders are categorized, and colour-coded as high (red), medium (yellow) or low (green) depending on their level of interest in the Project as measured by an assessment of the magnitude of stakeholder influence and impact on the Project. In line with each stakeholder's level of interest, disclosure and consultation activities are determined based on certain frequencies for construction and operation phases of the Project. Disclosure and consultation activities to be implemented throughout the lifetime of the Project is outlined in Section 18.5.3 and detailly explained in the SEP together with the proposed implementation timetable.

Table 18.1: External Stakeholder List for Governmental Authorities

GOVERNMENTAL BODIES

Level	Organization	Relation to the Project	Level of Interest
National	Ministry of Energy and Natural Resources	Ministry of Energy and Natural Resources and its relevant departments have regulatory functions relation to the Project and its components.	High
	Energy Market Regulatory Authority (EMRA)	EMRA is one of the key stakeholders of the Project in relation to the Project scope and components in general.	High

GOVERNMENTAL BODIES

Level	Organization	Relation to the Project	Level of Interest
	Turkish Electricity Transmission Company (TEIAS)	TEIAS is a key stakeholder when the ETL of the Project is considered.	High
	Ministry of National Defence	Ministry of National Defence is a significant stakeholder since securing the Project area is crucial.	Low
	Ministry of Agriculture and Forestry (MoAF)	MoAF may have specific views about the design, construction, and operation activities of the Project.	Medium
	MoAF, General Directorate of Food and Control		
	MoAF, General Directorate of Livestock		
	MoAF, General Directorate of Fisheries and Aquaculture		
	MoAF, General Directorate of Nature Conservation and National Parks		
	MoAF, General Directorate of State Hydraulic Works		
	MoAF, General Directorate of Water Management		
	Ministry of Environment, Urbanization and Climate Change (MoEUCC)	MoEUCC has regulatory functions in relation to the Project such as environmental impact assessment permits and environmental permitting.	Medium
	MoEUCC, General Directorate of EIA, Permit and Audit		
	MoEUCC, General Directorate of Environmental Management		
	MoEUCC, General Directorate of Infrastructure and Urban Transformation		
	MoEUCC, General Directorate of Spatial Planning		
	MoEUCC, General Directorate of Protection of Natural Assets		
	Ministry of Transport and Infrastructure (MoTI)	MoTI may have specific views regarding evaluation of the Project.	Medium
	MoTI General Directorate of Infrastructure Investments		
	MoTI General Directorate of Highways		
	Ministry of Labour and Social Security (MoLSS)	MoLSS may have specific views on labour and working conditions, and health and safety of the Project personnel.	Low
	MoLSS, General Directorate of Labor		
	MoLSS, General Directorate of Occupational Health and Safety		
	Ministry of Culture and Tourism (MoCT)	MoCT may have views in terms of legislation.	Low
	MoCT General Directorate of Cultural Heritage and Museums		
Regional	19th Regional Directorate of DSI (State Hydraulic Works)	This organization may have specific views about water courses running close to the Project area.	Low
	15th Regional Directorate of Ministry of Agriculture and Forestry	This organization may have specific views on the potential protected areas close to the Project area and the status of the trees in the Project area.	High
	16th Regional Directorate of Highways	The organization may provide opinion regarding road crossing within the Project area.	High

GOVERNMENTAL BODIES

Level	Organization	Relation to the Project	Level of Interest
	Sivas Regional Directorate for the Conservation of Cultural Property	This organization is an important stakeholder to identify and clarify the archaeological potential of the Project area.	High
Provincial and District	The Governorship of Sivas	The governorships representing the national government are the highest authorities in the provinces.	High
	Sivas Provincial Directorate of Planning and Coordination	This organization coordinates all kinds of investment and construction works to be carried out by ministries and other central government organizations in the provinces.	High
	Sivas Municipality	The municipality and its relevant departments will have responsibilities in relation to the Project.	High
	Sivas Municipality, Directorate of Planning and Project		
	Sivas Municipality, Directorate of Zoning and City Planning		
	Sivas Municipality, Climate Change and Zero Waste		
	Sivas Municipality, Directorate of Civil Works		
	Sivas Municipality, Directorate of Transportation		
	Sivas Governorship Provincial Directorate of Social Security Institution	This organization may provide specific views on labour and working conditions, and health and safety of facility personnel.	Low
	Sivas Governorship Provincial Directorate of Environment, Urbanization and Climate Change (PDoEUCC)	PDoEUCCs of the provinces have regulatory functions related to the Project such as environmental impact assessment permits and environmental permitting.	High
	Sivas Provincial Directorate of Environment and Urbanization	This organization has regulatory functions in relation to the Project such as environmental impact assessment permits and environmental permitting.	High
	Sivas Provincial Directorate of Agriculture and Forestry	This organization may provide provincial-specific and/or site-specific views on the Project.	High
	Sivas Provincial Command of Gendarmerie	This organization may provide provincial-specific and/or site-specific views on the Project.	Medium
	Sivas Water and Sewer Administration	This organization may provide an opinion related to water/wastewater infrastructure of the Project area.	Medium
	The District Governorship of Gürün	The Project area is located in Gürün district and the local governorship, the central municipality, and their related departments are stakeholders regarding obtaining relevant permits, approvals during planning, and construction and operation phases of the Project.	High
	The Municipality of Gürün		
	Directorate of Civil and Construction Works		
	Directorate of Water Works		
	Directorate of Municipal Police		
	Gürün District Directorate of Health		Medium
	Gürün District Gendarmerie Command		Medium
	Gürün District Directorate of Agriculture and Forestry		High

Table 18.2: External Stakeholder List for Non-Governmental Bodies

NON-GOVERNMENTAL BODIES

Level	Organization	Relation to the Project	Level of Interest
Provincial and District	Turkish Wind Energy Association	These foundations, associations, and chambers may provide their specific views related to the Project	High
	Türkiye Foundation for Combating Erosion, Afforestation and Protection of Natural Assets (TEMA)		
	Environmental Protection and Research Foundation (ÇEV-KOR)		

NON-GOVERNMENTAL BODIES

Level	Organization	Relation to the Project	Level of Interest
	Turkish Environmental Protection Foundation (TUÇEV)		
	Turkish Nature Conservation Association		
	Foundation for the Protection and Promotion of Environmental and Cultural Values (ÇEKÜL)		
	World Wide Fund for Nature (WWF) Türkiye		
	Bird Life International Türkiye Partner- Doğa Association		
	The Nature Conservation Centre		
	Resource, Environment and Climate Association (REC)		
	Ecological Research Society (EKAD)		
	Greenpeace Akdeniz Türkiye		
	Association for Sustainable Economics and Finance Research (SEFiA)		
	Sivas Province Bee Breeders Association		
	Sivas Association of Animal Protection		
	Sivas Association of Woman Farmers		
	Sivas Association of Sustainable Development and Migration Prevention		
	Sivas Association of Producer Women Entrepreneurs Solidarity		
	Sivas Urban Women's Association		
	Sivas Disabled People's Association		
	Sivas Chamber of Merchants and Craftsmen		
	Sivas Chamber of Commerce and Industry		
	Sivas Chamber of Agriculture		
	Gürün Chamber of Merchants and Craftsmen		
	Gürün Chamber of Commerce and Industry		
	Gürün Chamber of Agriculture		
	Gürün Association of Environmental Forestation		

Table 18.3: Other External Stakeholder Groups

STAKEHOLDER GROUPS

Level	Group	Relation to the Project	Level of Interest
Mukhtars/Residents/Local Communities	The mukhtars and residents at the nine Project affected villages and additional two villages which are located in the nearby of the Project Licence area (Çiçekyurt, Kürkçü, Davulhüyük, Koyunlu, Reşadiye, Yılanhüyük, İncesu, Kaşköy, Kızılpınar, Böğrüdelik and Konakpınar)	Villages are key stakeholders considering potential impacts of the Project.	**High**
	Local businesses and enterprises (Local shops, beekeepers, income-generating agricultural lands)		
	Local communities including PAPs subject to direct land acquisition		
Vulnerable/ Disadvantaged Groups	Women	Vulnerable groups are key stakeholders considering potential impacts of the Project.	**High**
	The landless/homeless people		
	The elderly		
	Students		
	People with disabilities		
	Unemployed people		
	Syrians under temporary protection (SuTP)		
	Refugees under international protection (UIP)		

STAKEHOLDER GROUPS

Level	Group	Relation to the Project	Level of Interest
Media	Local, regional, and social media (including but not limited to the following newspapers, TV stations, social media channels): • Sivas İrade Newspaper • Sivas Ekspres Newspaper • Memleket Sivas Newspaper • Sivas Egemen Newspaper • Sivas Postası • Channel 58 • Sivas SRT • Vizyon 58	It is important to engage with local and regional media organizations for effective public disclosure and consultation.	Medium
Universities	Sivas Cumhuriyet University Sivas University of Science and Technology	Universities are one of the key stakeholders when research needs to be conducted within the scope of the Project.	Medium
Other potentially affected local social institutes	Local schools Mosques Local coffeeshops Gürün State Hospital Gürün District Fire Station	It is essential to ensure that the social environments that pose a significant place for community health, safety and security issues (i.e., hospitals, fire stations) and/or where key stakeholders utilize/ spend their time are operating properly at every stage of the Project.	Medium

Table 18.4: Internal Stakeholder List

INTERNAL STAKEHOLDERS

Level	Organization	Relation to the Project	Level of Interest
Internal Stakeholders	Project employees Contractors and subcontractors and their employees Suppliers and their workers	These groups are one of the key stakeholders in terms of continuation of the Project activities in compliance with the international standards.	High

18.4 ESIA Consultation Activities and Outcomes

18.4.1 Overview

International standards emphasize that stakeholder engagement and consultation is one of the key components of the ESIA process to reach and inform as many stakeholders as possible, especially those in the Project area of influence through the stakeholder engagement activities.

In this regard, the objectives of the Project's stakeholder engagement and consultation process include ensuring that identified stakeholders are appropriately informed and consulted on issues that could potentially affect them and maintaining a constructive relationship with stakeholders on an ongoing basis throughout the lifecycle of the Project.

18.4.2 Previously Carried out E&S Activities

During the National EIA process and prior to the ESIA studies, the Project Company conducted consultation activities with the governmental bodies to receive opinions on the Project through correspondence. These consulted governmental bodies are listed below:

- Ministry of Energy and Natural Resources
  - General Directorate of Mining Affairs
- Ministry of Environment, Urbanization, and Climate Change (formerly known as Ministry of Environment and Urbanization)
  - General Directorate of Environmental Impact Assessment, Permitting and Inspection
  - General Directorate of Spatial Planning
- Ministry of Agriculture and Forestry (formerly known as Ministry of Forestry and Water Affairs)
  - General Directorate of Nature Conservation and National Parks
  - General Directorate of State Hydraulic Works
  - General Directorate of Forestry
- Ministry of Culture and Tourism
  - Sivas Cultural Heritage Preservation Regional Board Directorate
- Sivas Governorship
  - Provincial Directorate of Environment, Urbanization and Climate Change
  - Provincial Disaster and Emergency Directorate
  - Provincial Directorate of Food, Agriculture and Forestry
- Gürün Municipality
  - Department of Water and Sewerage
- Sivas City Administration
  - Directorate of Zoning and Urban Development

The official correspondences conducted within the scope of environmental and social studies were provided in the final National EIA Report which was shared with the Consultant. The information of the official letters is shared in Appendix C.

In this context, a public participation meeting was carried within the scope of the National EIA Studies by the Sivas Provincial Directorate of Environment and Urban Planning in Çiçekyurt village, Gürün, Sivas, on 5 December 2017. This meeting aimed to engage with the public, provide information about the Project, and gather their feedback regarding the Project. The meeting details were announced through local (*Sivas Memleket*) and national (*Posta*) newspapers and notices were sent to the villages. During the meeting, informational brochures detailing the Project, its potential environmental impacts, and proposed measures were distributed to the local communities. At the meeting, the local communities raised specific questions regarding employment opportunities, electromagnetic effects, expropriation, and the planned commencement date of the Project. The discussions held during these meetings were documented in final National EIA report.

The minutes of the public participation meeting were shared with the Consultant by the Project Company. Accordingly, stakeholders asked questions about the following issues:

- The commencement date of the Project,
- Employment opportunities within the scope of the Project,
- Benefits of the Project to the Project affected villages and their residents,
- Land acquisition and expropriation processes within the scope of the Project,
- Possibility of utilization of generated electricity by the Project affected villages and their residents,
- Whether the pasturelands within the Project Licence Area can be used or not when the Project starts,
- The payment to be made for the pasturelands,
- Magnetic impact of the Project on people and animals, and
- Noise impact of the Project on animals.

Additionally, stakeholder engagement activities were also performed within the scope of Environmental and Social Due Diligence (ESDD) process of the Project conducted by Project Company's external ESDD Consultant in December 2023. During stakeholder activities, six mukhtars from neighbouring settlements (Çiçekyurt, Davulhüyük, Reşadiye, Yılanhüyük, Kürkçü, and Koyunlu) were interviewed. It was stated in the Final ESDD Report that the mukhtars had limited knowledge about the Project. Their main concern was related to the traffic impacts of the Project due to the inadequate road infrastructure. In line with this concern, their request was about village road improvements within the scope of the Project. Other than that, the expectation regarding the local employment opportunities was noted by the external consultants of the Project Company. Consulted mukhtars added that there was no negative approach by the residents towards the Project. Also, the representatives of Kangal WPP, which is located near the Project area, were consulted during the ESDD studies. As reported by Kangal WPP representatives, there is an ongoing capacity extension project within their operation area. In this regard, they had concerns about the construction timeline of the Project and requested to receive the timeline. Kangal WPP representatives had a positive approach towards working in collaboration with the Project Company representatives to mitigate the risks related to construction timeline and workload.

18.4.3 Stakeholder Engagement Activities during ESIA

The Consultant conducted a site visit on 22-23 January and 8-9 July 2024 within the scope of the ESIA study of the Project. The aim of the site visit in January 2024 included collecting baseline data about the Project affected villages, understanding the Project-related concerns and expectations of the local community members, reflecting the views of key stakeholders, and identifying vulnerable groups. In line with these aims, mukhtars, and local residents were consulted during the site visit in order to identify local community members and other Project stakeholders, understand their perceptions about the Project, address any concerns they may have about the Project, and identify the Project impacts. The external stakeholders interviewed during the field studies are listed below:

- Gürün District Directorate of Agriculture and Forestry
- Mukhtar and residents of Çiçekyurt village
- Mukhtar and residents of Koyunlu village
- Mukhtar of Kürkçü village
- Mukhtar of Reşadiye village
- Mukhtar of Yılanhüyük village

The main findings of these consultations are summarized below:

- The majority of the consulted mukhtars and residents has been aware of the Project since the public participation meeting held in 2017.
- Consulted residents of Çiçekyurt village had some concerns about the Project's potential adverse impacts, which particularly include damage to the existing roads and water supply network.
- As reported by the Gürün District Director of Agriculture and Forestry, the pasturelands in the Project affected villages are plentiful and no difficulties about the restriction and/or limitation regarding the pasturelands deriving from the Project's land acquisition activities are foreseen.

The following development areas were suggested and/or expected by the consulted stakeholders:

- Improving the road quality throughout the access routes between the district centre and the Project affected villages.
- Constructing a mutual road for the utilization of residents in the Project affected villages (particularly Çiçekyurt, Kürkçü, and Koyunlu). As reported by the mukhtars, access roads to the villages are closed in winter due to bad weather conditions. When they request for the governmental roadside assistance, a prioritization is made based on the population. However, since the populations in the majority of the Project affected villages are low in winter, they fall behind in this prioritization. Therefore, if the Project Company could provide support in construction of a mutual road that will be commonly used by the residents of the Project affected villages, they could receive easier assistance in winter. Additionally, accessing to the Gürün district centre from some villages (namely Kürkçü and Koyunlu) takes quite a long time and distance due to the inefficiency of the existing road. By constructing the mutual road as per the route suggested by the mukhtars, both the time and distance could be lowered.
- Improving the water supply network quality in Çiçekyurt village since it may be affected by the Project's construction activities.
- Providing barley, wheat and apricot seedling support in Gürün district.
- Providing vaccination support against common tree and animal diseases in Gürün district.
- Providing support for the beekeepers in Gürün district through hive supply, quality check, and reclamation studies.
- Creating local employment opportunities for the youth and unemployed in the nearby villages (particularly Çiçekyurt, Yılanhüyük and Koyunlu).
- Providing support to construct or improve the drinking water depot/tank, school, and social facility for weddings and funerals in the nearby villages.

This Section will be updated based on the findings of external stakeholder interviews to be held during the additional field visit.

18.4.4 ESIA Public Disclosure and Consultation

A disclosure package of the Project that includes the Final Draft ESIA Report together with the SEP, Non-Technical Summary (NTS) and Environmental and Social Management Plan (ESMP) (both in English and Turkish) will be disclosed to the public through the Project Company's website. The objective is to enable the Project stakeholders to review the results of the ESIA study as well as to gather their comments and questions on the outcomes. The duration of the disclosure period will be determined in agreement with the Lenders upon final categorisation of the Project.

During the disclosure period, the findings of the ESIA studies, potential impacts of the Project and mitigation measures to be applied will be shared with the mukhtars of the Project affected

settlements via an information briefing that involves a summary about the ongoing ESIA process as well as communication channels that the Project stakeholders can report their opinions and comments about the Project.

The documents in the disclosure package will be revised and finalized in line with the feedback from the Project stakeholders. Finalized disclosure package will also be published on the Project Company's website.

The documents in the disclosure package will be revised and finalized in line with the feedback from the Project stakeholders. Finalized disclosure package will also be published on the Project Company's website.

18.5 Stakeholder Engagement and Consultation Approach Throughout the Lifetime of the Project

18.5.1 Stakeholder Engagement Plan

Within the scope of the ESIA process, a Project-specific SEP covering the construction and operation phases is prepared by the Consultant. The objective of the SEP is to present a strategic guideline for future stakeholder engagement and consultation activities that will be implemented throughout the Project lifecycle in a comprehensive and culturally appropriate way. Also, the SEP will follow a gender-sensitive approach during all implementation phases.

The SEP defines the stakeholder engagement activities to be organized, grievance mechanism to be applied, and the Project personnel responsible for the overall SEP implementation. During the definition of these components, the corporate level SEP, which has been prepared by the Project Company and is in place since August 2023, was utilized. The corporate SEP also describes the grievance mechanism, disclosure approach, commitment to meaningful consultation, and participation and ongoing reporting to external stakeholders of the Project Company.

As per the documents and information shared by the Project Company, it is seen that the stakeholder engagement activities conducted so far have followed a PAP-centred and structured framework in line with the international requirements. The same approach will continue to be applied on site throughout the Project lifecycle.

Stakeholder engagement and consultation activities will be conducted throughout the Project's pre-construction, construction and operation phases and recorded into a central log with relevant details (i.e., stakeholder group, consultation subject, and outcomes of the consultation).

In addition, a Project-specific grievance mechanism will be established and implemented as defined in the SEP for long-term communication between the Project and the stakeholders. Received grievances will be registered into a central log with relevant details (i.e., subject, priority level, and actions taken).

Both the stakeholder engagement process and management of the grievance mechanism that will be followed throughout the Project lifecycle is described in the SEP in detail. SEP will ensure communication tools and information sharing mechanism accessible to the vulnerable groups identified within the scope of the Project.

The Project Company is committed to actualize effective stakeholder engagement as defined in the SEP and in line with the IFC PS1, EBRD PR10, and EP IV Principles 5 and 6 requirements. The SEP will be revised with the outcomes of the public participation meeting that will be conducted after the Final Draft ESIA Report is prepared and disclosure package of the Project is shared with the public.

The SEP is a live document; therefore, it will also be reviewed and updated regularly and will include stakeholder engagement activities carried out during the pre-construction, construction, and operation phases of the Project. The SEP will be updated on an annual basis and the updated version will be published on the Project website.

18.5.2 Community Liaison Officer (CLO)

The main point of contact for the Project stakeholders will be the CLO. Accordingly, disclosure, consultation and engagement activities of the Project will also be managed by the CLOs on the basis of the stakeholder engagement and consultation program defined in the SEP. The Project Company will be involved in the stakeholder engagement and consultation activities when necessary.

The CLOs will also be responsible for registering the stakeholder engagement and consultation activities into the Project-specific consultation log. Sample consultation log is provided in Appendix D.

18.5.3 Stakeholder Engagement and Consultation Program

Stakeholders that are defined in the Section 18.3.2 will be consulted about the Project's relevant subject matters (i.e., Project's development stages, potential impacts and mitigation measures, communication channels with stakeholders, and grievance mechanism of the Project) through variety of communication methods on a frequent basis. Please see the SEP for details on the future stakeholder engagement approach of the Project together with the proposed implementation timetable and responsibilities for stakeholder engagement throughout the lifetime of the Project.

18.6 Project Grievance Mechanism

18.6.1 Overview

The Project Company is required to establish an effective and accessible grievance mechanism as a part of the stakeholder engagement, information disclosure and consultation. The aim of the grievance mechanism is to provide channels that are free of manipulation, coercion, and intimidation in which stakeholders can report their requests, concerns and grievances regarding the Project and its impacts. Responding to grievances and resolving them in a timely, proactively, unbiased, effective, and efficient manner is essential according to the international standards and requirements on stakeholder engagement. Specifically, it provides a transparent and credible process for fair and sustainable outcomes. By this way, trust and cooperation could be mutually developed among the Project stakeholders and the Project Company through corrective actions. Main components of a successful grievance mechanism also include anonymity, confidentiality, and transparency principles. Project's grievance mechanism is explained in the SEP in more detail.

According to the corporate level SEP that has been in place since August 2023, the Project Company has a grievance mechanism for the Project stakeholders. There is a grievance register form used for registration of the grievance. The form is saved within the E-Makin system of the Project Company, which is used for documentation and workflow management.

Grievances are categorized as external and internal depending on the type of the stakeholder. Since they have different grievance channels and resolution processes, they are defined in Sections 18.6.2 and 18.6.3 separately.

18.6.2 Principles of the Grievance Mechanism

To ensure compliance with the international standards (particularly IFC PS1, EBRD PR10, and EP IV Principles 5 and 6), there are a number of principles that the Project Company will apply to the Project's grievance mechanism in general. These principles can be summarized as follows:

- There will be a formalized and written Project Grievance Mechanism Procedure that involves the principles of the mechanism (including anonymity), available channels with contact details of the CLO, defined timeframes for acknowledgement of the receipt of complaints and subsequent resolution, sample subjects that describes the type of grievance as per the identified Project impacts (i.e., noise, air, visual, dust, GBVH, labour management, and traffic), and management and resolution process together with the assigned responsible Project staff.
- Grievance mechanism will be committed to confidentiality and anonymity. Grievance channels both online and offline will be enabled to receive anonymous applications.
- It is crucial to provide appropriate environment where all internal and external stakeholders can easily report any GBVH-related grievance in a safe and confidential way when they need. GBVH cases will be registered and processed as a part of the current grievance mechanism. However, they will be approached in a more sensitive way and in an immediate time manner through ensuring confidentiality, non-retaliation, protection, and supervision of victims, and utilize legal expertise when needed. A female CLO will be employed in order to work more effectively with women in case if occurs a GBVH incident during the lifetime of the Project.

18.6.3 External Grievance Mechanism

External stakeholders can use the grievance mechanism through the following channels:

- Verbal statements during face-to-face meetings/visits
- Phone calls and/or online messages (i.e., via WhatsApp) to the Project Company/CLO
- Petitions
- E-mails to the Project Company

The steps listed below summarize the external grievance mechanism process:

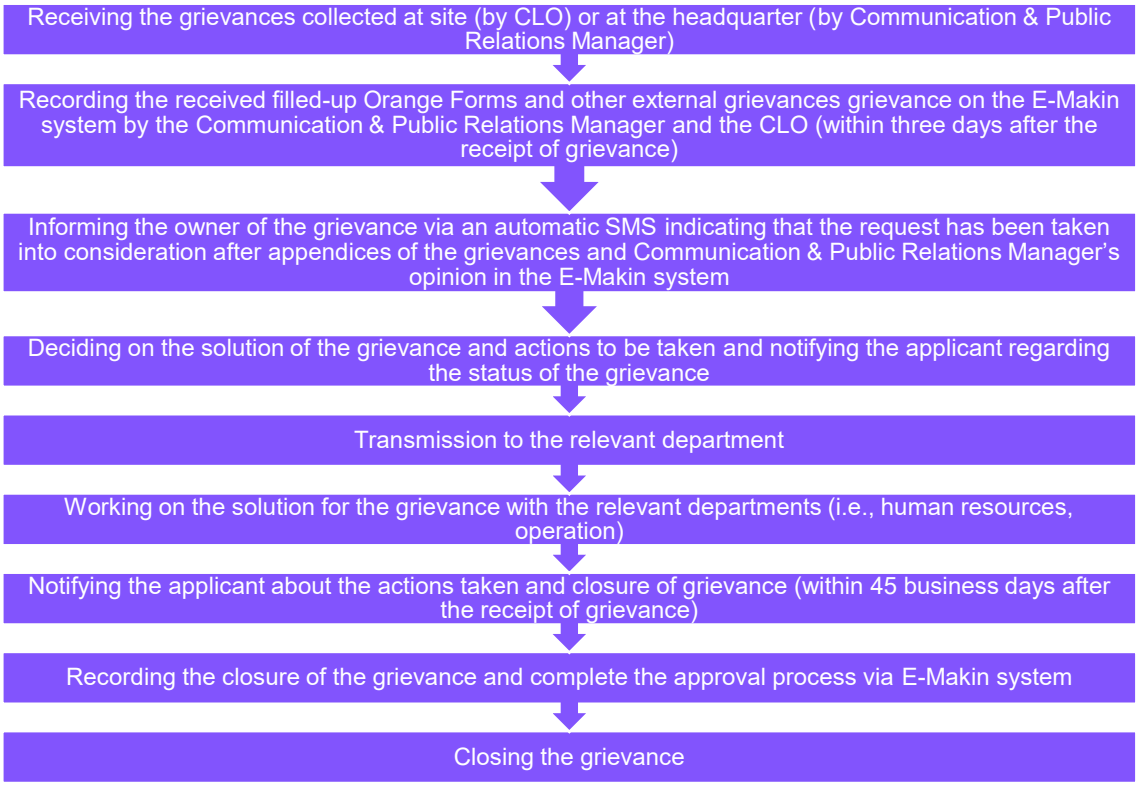


Figure 18.1: Steps of the External Grievance Mechanism Process

Should the Company be unable to resolve a complaint, or if the stakeholder is not satisfied with the outcome, the Company may consider seeking advice from other independent parties (i.e., local legal institutions and/or well-regarded NGOs) for further investigation, root cause analysis or actions in line with the good international practices on grievance management. Applicants always have the right to appeal to local or relevant legal authorities for a solution with which they are not satisfied.

Sample grievance log to be utilized by the Project Company throughout the Project is provided in Appendix E.

As part of the Project's external grievance mechanism:

- The Project CLO will manage and monitor the grievance mechanism process in a close way since s/he is the main contact point on site for the stakeholders.
- All grievances will be reviewed to be classified whether they are genuine and related to the Project activities or not. If the issues/disputes raised are not related to the Project activities, kind guidance is provided to the applicant to contact relevant party.
- For eligible grievances, CLO will assign actions to the relevant Project Company staff (depending on the subject of the grievance) for their assessment and clarification of the grievance resolution actions.
- CLO will inform the applicant on resolution actions taken/to be taken. If the case requires a more complex investigation, this is also conveyed to the applicant. It is ensured that applicant is provided with updated information at each step of the process until the clarification of resolution actions.
- In general, grievances are estimated to be resolved and closed within 45 business days after the receipt. In addition to this, the timeline can change depending on the nature, subject and scope of the grievance (i.e., the applicant's physical unavailability at the location of the

grievance, inconvenient land/seasonal conditions, need for third-party assessments, arrangement of schedule for maintenance/repair works). Accordingly, the Project Company will make a prioritization among the grievances by considering their nature, subject matters and scope. The resolution period for the grievances with high priority will be revised as seven days after the receipt of the grievance. For the grievances with medium priority, timeline will be 15 business days and the grievances that are prioritized as low will be resolved within 30 business days.

- Should the Project Company be unable to resolve a grievance, or if the stakeholder is not satisfied with the outcome, the Project Company may consider seeking advice from other independent parties. Applicants always have the right to appeal to local or relevant legal authorities for a solution with which they are not satisfied.

18.6.4 Internal Grievance Mechanism

Internal grievance mechanism covers the grievances of all employees working under the Project Company. Grievances from contractors or sub-contractors will be managed under external grievance mechanism. The Project Company has formal employee grievance mechanisms and, some of these practices are applied within the Project area. However, some improvement areas have been notified during the ESIA process of the Project.

The Human Resources Department will be the main implementation body for the internal grievance mechanism of the Project.

Internal grievance channels include Orange ethics hotline, e-mail address, and a system named Transparent Chair provided by the Project Company, which allows employees to raise their questions and grievances anonymously, employee committee meetings, reporting grievances to the managers and Human Resources Department representatives verbally or in a written way, E-Makin System of the Project Company, and grievance boxes placed at the Project mobilization areas.

The following will be applied for all grievance channels for the successful implementation and management of internal grievance mechanism:

- Grievances will be classified and prioritized depending on their subjects while registering to the grievance log. Accordingly, resolution period for the grievances with high priority is recommended to be seven days after the receipt of the grievance. For the grievances with medium priority, it is 15 business days and the grievances that are prioritized as low can be resolved within 30 business days.
- After the grievances are successfully closed and the corrective actions are taken, the results of the grievances including anonymous grievances will be displayed on the notice boards within the Project site.

In summary, all Project staff will be able to report their grievances through one-to-one meetings, petitions, telephone calls, e-mails, online forms grievance boxes (including site offices e.g., canteens and/or worker accommodation locations), and collective meetings. The Project Company aims at creating a positive working environment based on open and continuous communication.

18.6.5 Grievance Mechanism Channels and CLO Contact Details

The channels listed below can be used for receiving grievances.

Grievance Mechanism Channels

- Official letter and/or petition to:

  - The Head Office (Pürtelaş Hasan Efendi Mah. Meclis-i Mebusan Cad. No: 35/37 Salıpazarı,34427 Beyoğlu/İstanbul), or
  - The Project Administration Office **[TBD]**
  - Website: https://www.beesoru.com/

  Phone number of the Head Office: (0212) 340 27 60- 286 39 85
- The Project specific e-mail address: **[TBD]**
- Grievance boxes located at the popular locations (i.e., teahouses and/or mukhtars' offices) in the Project affected villages

Contact Details of the CLO

- Name: Ahmet Eğit (Construction / Site)
- Phone number: 0 (532) 744 28 39

Ethical Violation Declaration Channels

- E-mail address: orangeethics@borusan.com
- Website: www.orangeethics.com

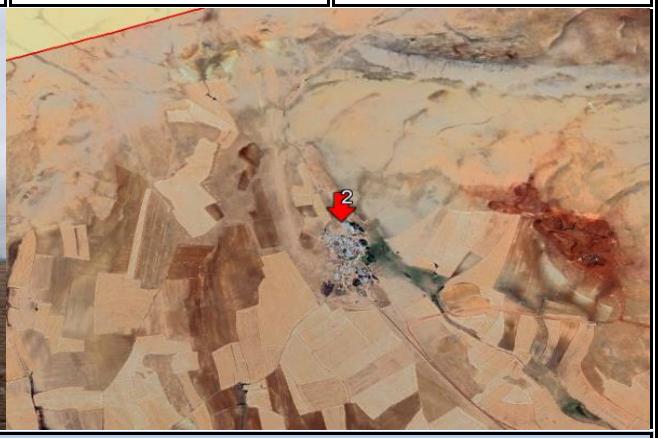
Appendices

A. Noise Measurement Results
B. Title Deeds of 42 Public Parcels
C. Official Correspondences
D. Sample Project Consultation Log
E. Sample Project Grievance Log
F. ESIA Team

A. Noise Measurement Results

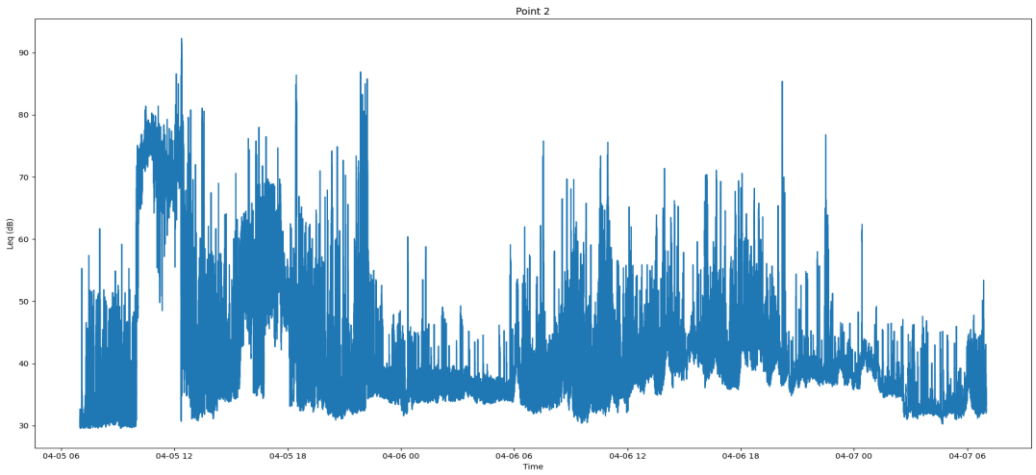
FREKANS ÇEVRE LABORATUVARI	**PELİT WIND POWER PLANT NOISE MEASUREMENT RESULTS**

Location	Yılanhöyük	**Measurement No.**	Point 2
Standard	ISO 1996-2	**Measurement Date**	05.04.2024 - 07.04.2024



Measurement Info			
SLM Type	Type 1	**Coordinates**	Latitude: [38.860228] Longtitude: [37.187837]
Total Period	48 Hours	**Mic. Height (m)**	2.5

Logger Graph (dBA)



FREKANS ÇEVRE LABORATUVARI	PELİT WIND POWER PLANT NOISE MEASUREMENT RESULTS		
Location	Yılanhöyük	**Measurement No.**	Point 2
Standard	ISO 1996-2	**Measurement Date**	05.04.2024 - 07.04.2024

Hourly Measurement Results (dBA) - First Day

Date and Time	Leq	L10	L50	L90
5-4-2024 07:00 - 08:00	35.8	36.7	30.8	30.0
5-4-2024 08:00 - 09:00	37.4	39.7	32.3	30.6
5-4-2024 09:00 - 10:00	41.0	37.5	30.9	30.0
5-4-2024 10:00 - 11:00	73.9	76.3	73.9	67.9
5-4-2024 11:00 - 12:00	70.6	73.2	69.8	66.1
5-4-2024 12:00 - 13:00	71.6	74.9	56.6	38.6
5-4-2024 13:00 - 14:00	55.3	49.3	37.9	33.1
5-4-2024 14:00 - 15:00	43.4	45.0	37.5	34.8
5-4-2024 15:00 - 16:00	54.2	58.3	48.8	36.1
5-4-2024 16:00 - 17:00	58.2	62.6	48.2	37.0
5-4-2024 17:00 - 18:00	59.4	64.0	54.8	48.8
5-4-2024 18:00 - 19:00	62.9	51.1	41.7	34.7
5-4-2024 19:00 - 20:00	46.8	48.6	39.8	34.9
5-4-2024 20:00 - 21:00	49.8	47.0	33.9	32.0
5-4-2024 21:00 - 22:00	59.5	48.3	34.0	32.6
5-4-2024 22:00 - 23:00	65.0	56.0	36.9	35.0
5-4-2024 23:00 - 00:00	37.5	39.5	35.5	34.6
6-4-2024 00:00 - 01:00	36.9	38.2	34.7	32.8
6-4-2024 01:00 - 02:00	38.0	38.0	35.1	34.4
6-4-2024 02:00 - 03:00	36.8	38.2	35.7	34.7
6-4-2024 03:00 - 04:00	36.9	37.7	35.9	34.9
6-4-2024 04:00 - 05:00	35.5	36.5	35.4	34.4
6-4-2024 05:00 - 06:00	37.6	36.7	35.3	34.6
6-4-2024 06:00 - 07:00	42.0	45.0	37.8	33.8

dBA	Raw Leq	Processed Leq
Day (07:00-19:00)	66.6	43.2
Evening (19:00-23:00)	60.2	42.2
Night (23:00-07:00)	38.1	37.6
LDEN	64.6	45.8

dBA	Raw Leq	Processed Leq
Day (07:00-22:00)	65.7	42.9
Night (22:00-07:00)	55.5	38.8
LDN	65.6	46.1

FREKANS ÇEVRE LABORATUVARI	PELİT WIND POWER PLANT NOISE MEASUREMENT RESULTS		
Location	Yılanhöyük	**Measurement No.**	Point 2
Standard	ISO 1996-2	**Measurement Date**	05.04.2024 - 07.04.2024

Hourly Measurement Results (dBA) - Second Day

Date and Time	Leq	L10	L50	L90
6-4-2024 07:00 - 08:00	47.6	39.9	35.5	33.3
6-4-2024 08:00 - 09:00	45.3	45.3	38.5	34.8
6-4-2024 09:00 - 10:00	46.9	49.3	37.3	32.8
6-4-2024 10:00 - 11:00	50.6	46.7	35.9	33.3
6-4-2024 11:00 - 12:00	40.6	41.6	36.3	34.1
6-4-2024 12:00 - 13:00	42.9	44.7	38.4	36.4
6-4-2024 13:00 - 14:00	44.3	45.2	39.0	36.3
6-4-2024 14:00 - 15:00	45.8	45.1	40.9	39.0
6-4-2024 15:00 - 16:00	43.0	44.3	42.6	40.6
6-4-2024 16:00 - 17:00	51.1	49.3	41.8	39.2
6-4-2024 17:00 - 18:00	45.4	44.2	39.1	37.1
6-4-2024 18:00 - 19:00	49.0	47.9	43.7	41.5
6-4-2024 19:00 - 20:00	44.4	45.4	41.5	39.0
6-4-2024 20:00 - 21:00	50.8	40.3	38.5	36.4
6-4-2024 21:00 - 22:00	39.6	40.2	38.8	37.5
6-4-2024 22:00 - 23:00	49.5	41.6	38.4	37.4
6-4-2024 23:00 - 00:00	39.6	41.1	39.2	37.3
7-4-2024 00:00 - 01:00	42.0	42.1	40.2	37.4
7-4-2024 01:00 - 02:00	38.2	40.6	36.6	35.4
7-4-2024 02:00 - 03:00	35.8	37.8	35.6	32.1
7-4-2024 03:00 - 04:00	35.1	35.7	32.9	32.1
7-4-2024 04:00 - 05:00	32.9	33.6	32.4	31.6
7-4-2024 05:00 - 06:00	33.6	34.7	32.9	32.1
7-4-2024 06:00 - 07:00	36.7	39.9	34.5	32.3

dBA	Raw Leq	Processed Leq
Day (07:00-19:00)	47.1	43.9
Evening (19:00-23:00)	47.9	40.6
Night (23:00-07:00)	37.7	37.2
LDEN	48.9	45.6

dBA	Raw Leq	Processed Leq
Day (07:00-22:00)	47.1	43.1
Night (22:00-07:00)	41.8	37.5
LDN	49.5	45.3

FREKANS ÇEVRE LABORATUVARI	**PELİT WIND POWER PLANT NOISE MEASUREMENT RESULTS**		
Location	Yılanhöyük	**Measurement No.**	Point 2
Standard	ISO 1996-2	**Measurement Date**	05.04.2024 - 07.04.2024

Measurement Results - Total		
dBA	**Raw Leq**	**Processed Leq**
Day (07:00-19:00)	63.6	43.4
Evening (19:00-23:00)	57.4	41.5
Night (23:00-07:00)	37.9	37.4
LDEN	61.7	45.7

dBA	**Raw Leq**	**Processed Leq**
Day (07:00-22:00)	62.8	43.0
Night (22:00-07:00)	52.7	38.2
LDN	62.7	45.7

B. Title Deeds of 42 Public Parcels

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	129		15.965,28 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508260 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 129 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ozan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	822		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SIVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	131		18.820,46 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508262 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 131 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	824		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SIVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	130		18.372,17 m2	

GAYRİMENKULÜN

Niteliği	HAMTOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508261 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 130 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	823		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayrimaddi haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	136		18.808,41 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508263 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 136 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	825		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	162		18.413,67 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508281 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 162 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	843		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	161		18.836,87 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508280 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 161 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ömcan TANRIKULU Mlk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	842		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhlerinin tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	160		18.258,16 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508279 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 160 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	841		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebliğat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	159		18.772,01 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508278 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 159 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ercan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	840		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebliğat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	158		18.594,97 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508277 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 158 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Asli Gibidir. Yusuf Ozan TANRIKULU Mülk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	839		30/12/2019		Cilt No.
Sahife No.		Sicline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	157		18.729,99 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508276 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 157 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Asli Gibidir. Yusuf Özcan TANRIKULU Mülk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	838		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	153		18.677,44 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508272 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 153 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ozcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	834		30/12/2019		Cilt No.
Sahife No.		Sicline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri aynî haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	KOYUNLU
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	149		18.372,17 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508268 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 149 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Yusuf Ozcan TANRIKULU
Mülki Emlak Şef Gör
Aslı Gibidir.

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	830		30/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	137		17.803,00 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508264 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 137 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	826		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	KOYUNLU
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	141		26.062,27 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508265 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 141 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Özcan TANRIKULU
Mülk Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	827		30/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile ilgili olan kayıtlar için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	KOYUNLU
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	147		3.918,94 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508266 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 147 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Ozan TANRIKULU
Milli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	828		30/12/2019		Cilt No.
Sahife No.		Sicilline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin ayrı ayrı haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	150		11.414,60 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508269 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 150 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özden TANRIKULU Mülî Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	831		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhleri için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	155		534,22 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508274 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 155 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özdan TANRIKULU Mülk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	836		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	KOYUNLU
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	152		31.984,06 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508271 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 152 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Ozcan TANRIKULU
Mülli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	833		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	151		5.731,89 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508270 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 151 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Asli Gibidir. Yusuf Özcan TANRIKULU Mülki Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	832		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	154		5.701,28 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508273 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 154 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Ozcan TANRIKULU
Milli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	835		30/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	156		6.765,65 m2	

GAYRİMENKULÜN

Niteliği	YOL
Sınırı	Planındadır Zemin Sistem No : 108508275 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 156 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Asli Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	837		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebliğat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KOYUNLU		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-18-b	104	148		5.920,55 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508267 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KOYUNLU Köyü 104 Ada 148 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	9	829		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile sınırlı olup olmadığı hakkında tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	DAVULHÜYÜK		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.18.b	103	117		3.023,46 m2	

GAYRİMENKULÜN

Niteliği	yol
Sınırı	Planındadır Zemin Sistem No : 108555453 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	DAVULHÜYÜK Köyü 103 Ada 117 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ozcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi			Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.			35	11	1052		06/01/2020		Cilt No.
Sahife No.			Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.									Sıra No.
Tarih			NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	DAVULHÜYÜK		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.18.b	103	119		219,72 m2	

GAYRİMENKULÜN

Niteliği	ham toprak
Sınırı	Planındadır Zemin Sistem No : 108555454 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	DAVULHÜYÜK Köyü 103 Ada 119 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Ozcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		35	11	1053		06/01/2020		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	DAVULHÜYÜK		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.18.b	103	116		492,97 m2	

GAYRİMENKULÜN

Niteliği	ham toprak
Sınırı	Planındadır Zemin Sistem No : 108555452 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	DAVULHÜYÜK Köyü 103 Ada 116 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		35	11	1051		06/01/2020		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	KÜRKÇÜ		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-13-d	109	3		2.709,69 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508258 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	KÜRKÇÜ Köyü 109 Ada 3 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Mülli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	4	302		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	145		17.647,84 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108390955 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Özcan TANRIKULU
Mülk Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	620		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut INAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	144		18.310,70 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108390954 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Asli Gibidir.
Yusuf Ozcan TANRIKULU
Milli Emlak Sef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	619		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	143		18.439,97 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108390953 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Ozcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	618		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir. ** Tebliğat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	146		18.138,27 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108390956 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Ozcan TANRIKULU
Mali Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	621		20/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	ÇİÇEKYURT		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	142		19.533,70 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108390952 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Ozcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	617		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut INAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	151		6.220,64 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108390961 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Asli Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	626		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti TAPU SENEDİ	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	ÇİÇEKYURT		
Sokağı			
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	147		4.744,99 m2	

GAYRİMENKULÜN		
	Niteliği	Yol
	Sınırı	Planındadır Zemin Sistem No : 108390957 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
	Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
	Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	622		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAD Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	ÇİÇEKYURT		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	148		3.756,10 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108390958 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	623		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SIVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	150		33.345,48 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108390960 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Mülk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	625		20/12/2019		Cilt No.
Sahife No.		Sicilline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayini haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	ÇİÇEKYURT
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.12.c	104	149		2.617,95 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108390959 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	ÇİÇEKYURT Köyü 104 Ada 139 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir
Yusuf Ozcan TANRIKULU
Milli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4623	7	624		20/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Sicilline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	YILANHÜYÜK		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.14.b	101	25		18.363,56 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108391048 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	YILANHÜYÜK Köyü 101 Ada 21 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Asıl Gibidir. Yusuf Ozan TANRIKULU Mülk Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4626	8	781		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih		NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir. ** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.						Tarih

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	YILANHÜYÜK		
Sokağı		TAPU SENEDİ	
Mevkii			

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.14.b	101	24		19.796,46 m2	

GAYRİMENKULÜN	
Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108391047 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	YILANHÜYÜK Köyü 101 Ada 21 Parsel taşınmazının İfraz İşlemi (TSM) işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4626	8	780		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebliğat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	YILANHÜYÜK
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.14.b	101	23		1.073,50 m2	

GAYRİMENKULÜN

Niteliği	Ham Toprak
Sınırı	Planındadır Zemin Sistem No : 108391046 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	YILANHÜYÜK Köyü 101 Ada 21 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Özcan TANRIKULU
Milli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4626	8	779		20/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	YILANHÜYÜK
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.14.b	101	26		1.796,95 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108391049 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	YILANHÜYÜK Köyü 101 Ada 21 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Ozcan TANRIKULU
Milli Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4626	8	782		20/12/2019		Cilt No.
Sahife No.								Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

Siciline Uygundur.
Bilgekut İNAL
Tapu Müdürü

NOT : * Mülkiyetin gayri ayni haklar ile serhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişlkliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS
İlçesi	GÜRÜN
Mahallesi	
Köyü	YILANHÜYÜK
Sokağı	
Mevkii	

Türkiye Cumhuriyeti

TAPU SENEDİ

Fotoğraf

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	K38.a.14.b	101	27		832,34 m2	

GAYRİMENKULÜN

Niteliği	Yol
Sınırı	Planındadır Zemin Sistem No : 108391050 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	YILANHÜYÜK Köyü 101 Ada 21 Parsel taşınmazının İfraz İşlemi (TSM) işleminden.
Sahibi	MALİYE HAZİNESİ Tam

Aslı Gibidir.
Yusuf Özcan TANRIKULU
Mülk Emlak Şef Gör

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4626	8	783		20/12/2019		Cilt No.
Sahife No.		Siciline Uygundur.						Sahife No.
Sıra No.		Bilgekut İNAL Tapu Müdürü						Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

İli	SİVAS	Türkiye Cumhuriyeti	Fotoğraf
İlçesi	GÜRÜN		
Mahallesi			
Köyü	REŞADİYE		
Sokağı			
Mevkii		TAPU SENEDİ	

Satış Bedeli	Pafta No.	Ada No.	Parsel No.	Yüzölçümü ha	Yüzölçümü m²	Yüzölçümü dm²
0,00	k38-a-19-a	101	155		1.513,94 m2	

GAYRİMENKULÜN

Niteliği	HAM TOPRAK
Sınırı	Planındadır Zemin Sistem No : 108508259 QRKodu kullanarak taşınmazın haritasına ulaşabilirsiniz.
Edinme Sebebi	REŞADİYE Köyü 101 Ada 155 Parsel taşınmazının Kamu Orta Mallarının Cins Değişikliği işleminden. Aslı Gibidir. Yusuf Özcan TANRIKULU Milli Emlak Şef Gör
Sahibi	MALİYE HAZİNESİ Tam

Geldisi		Yevmiye No.	Cilt No.	Sahife No.	Sıra No.	Tarihi	Gittisi	
Cilt No.		4781	7	607		30/12/2019		Cilt No.
Sahife No.		Siciline Uygundur. Bilgekut İNAL Tapu Müdürü						Sahife No.
Sıra No.								Sıra No.
Tarih								Tarih

NOT : * Mülkiyetin gayri ayni haklar ile şerhler için tapu kütüğüne müracaat edilmelidir.
** Tebligat Kanunu Hükümleri gereğince adres değişikliği ilgili Tapu Sicil Müdürlüğüne bildirilecektir.

C. Official Correspondences

Table C.1: The Official Correspondences Conducted within the Scope of Environmental and Social Studies to the Date

No	Official letter issued by the Authority	Official letter No / Doc. No	Issue Date / Signature Date	Content
1	Ministry of Environment, Urbanization and Climate Change (formerly known as Ministry of Environment and Urbanization) General Directorate of Environmental Impact Assessment, Permitting and Inspection	48331039-220.01-E.94347	28/05/2018	EIA Report regarding the Pelit WPP (80 MWm/80 MWe – 40 turbines) submitted to the Ministry through the Online EIA Process Management System was reviewed and evaluated by the Review and Evaluation Commission. Accordingly, "EIA Positive" decision was taken regarding the Project, and it shall be announced to the public by Sivas Governorship (Provincial Directorate of Environment and Urbanization). Compliance with the subjects specified in the Final EIA Report and its annex documents and the relevant provisions of the regulations that came into force pursuant to the Environmental Law No. 2872; obtained relevant permits from the relevant institutions in accordance with the current legislation; changes subject to the regulation to be made in the Project must be submitted to the Provincial Directorate.
2	Ministry of Environment, Urbanization and Climate Change (formerly known as Ministry of Environment and Urbanization) General Directorate of Environmental Impact Assessment, Permitting and Inspection	48331039-220.01-E.290387	11/12/2019	The Final EIA Report prepared for the Pelit WPP Project, which has a secured "EIA Positive" decision was examined and it was understood that each of 40 turbines having unit power of 2 MWm/2 MWe (Enercon E82 – Rotor Diameter: 164m – Hub Height: 98m – Swept Area: 21,124 m^2) has changed with 20 turbines having unit power of 4 MWm/4 MWe (Vestas V150 - Rotor Diameter: 150m – Hub Height: 105m – Swept Area: 17,671 m^2), with a change in turbine coordinates, but the electrical and mechanical power was not subject to any change. In this respect, it was concluded that; there will be no change in Project total installed power, no increase will be made in the number of turbines, the number of turbines have decreased by half, and no additional impacts are foreseen as a result of revision of the Project. Therefore, the "EIA Positive" decision given for the 80 MWm/80 MWe – 40 turbines on 28 May 2018 is applicable for the revised Project (MWm/80 MWe – 20 turbines).
3	Ministry of Environment, Urbanization and Climate Change (formerly known as Ministry of Environment and Urbanization) General Directorate of Spatial Planning	65842636-305.02-E.22363	21/12/2017	As a result of the examination of the EIA Application File, it was understood that the project in question fell within the scope of the "Yozgat-Sivas-Kayseri Planning Region 1/100,000 Scale Master Plan and the information and documents that shall be included in the EIA Report were listed in the official letter as: ● The original size copies of the 1/100,000 Scale Master Plan to the EIA Report, stamped "as original", indicating the scope of work in which the relevant plan sheets, legend and plan provisions are taken, and also prepare a separate document indicating the Project area in the approved Master Plans ● The relevant plan sheet (1/5,000 and 1/1,000 scale) of the approved zoning plan (1/5,000 and 1/1,000 scale) of the project area subject to EIA or the region in which the Project area is located (if any) is added to the report together with the legend sheet and plan provisions, stamped by the relevant administration as the "original" official institution and indicating the activity area on these plans, stating the approval dates of the zoning plan and the institution by which it was approved in the report, otherwise stating that there is no approved zoning plan and attaching it to the report by obtaining a letter from the relevant administration stating that there is no approved zoning plan

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No	Official letter issued by the Authority	Official letter No / Doc. No	Issue Date / Signature Date	Content
				In the EIA Report, the current land use of the Project area (e.g., agricultural, forest, urban residential area) must be explained and the use(s) remaining in the Master Plans shall be stated.
4	Ministry of Environment, Urbanization and Climate Change (formerly known as Ministry of Environment and Urbanization) General Directorate of Spatial Planning	65842636-305.02-E.65737	13/04/2018	As a result of the examination of the Project subject to EIA within the scope of the current "Yozgat-Sivas-Kayseri Planning Region 1/100,000 Master Plan", it was resulted that the Project area fall within the "Agricultural Land", "Meadow-Pasture" representations, and it was regulated in the subject plan regarding the energy production and transmission activities that: *"8.19.5.1 In renewable energy (wind, solar, geothermal, hydroelectric) production areas, 1/100,000 scale Master Plan changes can be made within the scope of the permissions obtained from relevant institutions and organizations and the license to be issued by the Energy Market Regulatory Authority, provided that the approval of the Ministry of Environment and Urbanization is obtained. Without any need, the master and implementation zoning plans prepared in line with the opinions of the relevant institutions and organizations are approved by the relevant administration and the plans are presented to the Ministry for information."* In this context, it was stated in the official letter that the work and procedures related to the EIA process can be carried out upon obtaining the appropriate opinions of all relevant institutions and organizations, especially the Ministry of Agriculture and Forestry (formerly known as Ministry of Food, Agriculture and Livestock and Ministry of Forestry and Water Affairs).
5	Ministry of Energy and Natural Resources General Directorate of Mining Affairs	N/A	13/04/2018	The Project area overlaps with four mining evaluation areas as of 27 December 2017; however, the area does not conflict with any mining operating/exploration licence area and/or raw material production permit. Therefore, the Project area is not considered as an area closed for mining activities by the General Directorate and has been listed as a special permit area for Pelit WPP (80 MWm / 80 MWe) with the official correspondence letter dated 28 December 2017 and numbered 44972. As a result of the examination and evaluations of the General Directorate, execution of the Pelit WPP Project has been evaluated as applicable.
6	Ministry of Agriculture and Forestry General Directorate of State Hydraulic Works	22549675-611.02-230206	02/04/2018	It was notified that the National EIA Report was examined by the Authority. It was indicated that the EIA process completion is found suitable, provided that the regulations in force are complied with by the Project.
7	Ministry of Agriculture and Forestry (formerly known as Ministry of Forestry and Water Affairs) General Directorate of Forestry	66995690-611.02-E.721298	03/04/2018	It was notified that the National EIA Report was examined by the Authority and although there are no deficiencies in terms of content. It was stated that the EIA Report would not hold any rights in future definitive permit requests within the scope of the Forest Law No. 6831 and would not replace any permit. In conclusion, no objection has been identified for the Authority to take the Final Decision within the National EIA considering all measures specified by the Department of Forest Fire Fighting would be taken and the permit requests are would be subject to re-evaluation during the permitting stage.

Table C.1: The Official Correspondences Conducted within the Scope of Environmental and Social Studies to the Date

No	Official letter issued by the Authority	Official letter No / Doc. No	Issue Date / Signature Date	Content
8	Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks	84815980-611.02-81807	04/04/2018	It is understood that 54 bird species were identified as a result of the studies carried out in and around the Project area. Following the commissioning of the WPP, these species shall be monitored for at least 25 days during the spring and autumn migration periods and the possible effects of the Project activities on the birds shall be investigated. During this monitoring process, six-monthly reports shall be prepared regularly and the details on field studies shall be stated in the report. Information shall be given in the report about the gathering areas for bird species, the populations of bird species using the area, and the amount of change observed at the end of the monitoring. In addition, monitoring studies for species that are likely to breed in the area need to be carried out. In the monitoring report; information shall be given about the bio-ecology of the species, such as the purpose for which the species uses the area, population size, breeding status, breeding areas and characteristics, number of breeding pairs, etc. Several key issues were identified within the official correspondence letter, and the correspondence letter indicated that the Project has to commit to stop the turbines which pose a danger to birds during migration periods in line with the data obtained as a result of monitoring, and if deemed necessary, dismantle the turbines which pose higher risks.
9	Ministry of Culture and Tourism, General Directorate of Cultural Heritage and Museums, Sivas Cultural Heritage Preservation Regional Board Directorate	74364744-611.02-E.3244779	13/04/2018	It is stated that there are no cultural assets or protected areas registered within the scope of Law No. 2863. In order to detect presence of any cultural heritage subject to registration, the Project area shall be examined on-site by the Directorate's experts. However, the Project area could not be examined by the Provincial Directorate due to adverse weather conditions in the region at the time of planned site examination. No examination has been carried out by the Provincial Directorate according to the official letter.
10	Sivas Governorship, Provincial Directorate of Environment, Urbanization and Climate Change	E-52429240-220.01-7769212	N/A	It was requested that the "EIA Positive" decision dated 28 May 2018 and numbered 5090, which was secured for the Pelit WPP Project, is transferred to Borusan ENBW Enerji Yatırımları ve Üretim A.Ş. in line with the board decision of the Energy Market Regulatory Authority dated 06 April 2023 and numbered 11779-19. During the inspection carried out at the Project site by the Provincial Directorate personnel, it was determined that no activities were started regarding the Project, no construction site was established, and no roads were opened. In this context, considering that no changes will be made in the EIA Report subject to the "EIA Positive" decision and no change will be made in the total installed power of the Project; all commitments made in the EIA Report and the obligations within the framework of the applicable legislation are directly borne by Borusan ENBW Enerji Yatırımları ve Üretim A.Ş., and the "EIA Positive" decision will not be re-issued. However, it is stated in the paragraph 5 of Article 14 of the new EIA Regulation that "If the investment is not initiated within the 5 years without force majeure for the project for which the EIA Positive decision has been issued, the EIA Positive decision will be deemed invalid.". Furthermore, the EIA Regulation which was in force

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No	Official letter issued by the Authority	Official letter No / Doc. No	Issue Date / Signature Date	Content
				at the date of "EIA Positive" decision states that "If the investment is not initiated within the 7 years without force majeure for the project for which the EIA Positive decision has been issued, the EIA Positive decision will be deemed invalid.". Accordingly, if the investment is not initiated by 28 May 2025, the "EIA Positive" decision will be deemed invalid.
11	Sivas Governorship, Provincial Disaster and Emergency Directorate	93961221-611.02-E.178858	29/11/2017	It was indicated that no studies were performed by the Directorate in regard with the subject area.
12	Sivas Governorship, Provincial Directorate of Food, Agriculture and Forestry	49509618-230.04.02-E.1139986	12/04/2018	The official correspondence letter indicates that; it was mentioned in the National EIA Report that permissions will be obtained under the scope of Ministry's legislation in case there are areas to be evaluated within the scope of Ministry's scope. The permission step shall be carried out before starting the Project works, submitting an application with the necessary documents and preparing a 'Survey Report' after a land survey, also other projects related to soil conservation shall be prepared and legal permissions shall be obtained within the scope of the Ministry's legislation in case deemed necessary.
13	Sivas Governorship, Provincial Directorate of Food, Agriculture and Forestry	49509618-230.04.02-E.2986432	N/A	Upon finalization of the area information on the Project area, in case there are areas to be evaluated within the scope of relevant legislation, before initiating the works, it is necessary to apply with the related documents and prepare a 'Feasibility Report', prepare other projects related to Soil Conservation Projects and obtain legal permissions within the scope of; the Soil Conservation and Land Use Law No. 5403 (for the agricultural lands within the Project area), Pasture Law No. 4342 (for the areas that are stated to be pastureland in official records), Agricultural Reform Law on Land Arrangement in Irrigation Areas with Law No. 3083, Aquaculture Law No. 1380 (for activities to be carried out in the water resources within the Project area).
14	Sivas City Administration, Directorate of Zoning and Urban Development	52821246-000-E.7101	13/04/2018	It was indicated that no objection is overseen regarding the the National EIA Report in question within the framework of the Administration's legal powers, duties and responsibilities.
15	Gürün Municipality Department of Water and Sewerage	51694603/135	09/02/2018	It was stated in the official correspondence letter that the domestic wastewater accumulated in the sealed septic tanks to be installed under the scope of Pelit WPP Project will be collected by the sewage trucks of the Municipality if the fee is paid in advance upon signing the relevant contract.

D. Sample Project Consultation Log

No	Date	Engagement Channel (i.e., phone call, face-to-face, consultation)	Authorized Person Conducting the Activity (i.e., CLO, Project Company representatives)	The Subject of the Engagement/Consultation Activity (i.e., current Project status, information disclosure, regular visit)	Type and Name of the Stakeholder Engaged (Community/Public, Mukhtar, etc.)	Number of Stakeholders Engaged	Meeting Place and Time	Notes from the Activity (i.e., employment requests, road safety grievances)	Comments/Feedback of the Authorized Person (i.e., CLO, Project Company representatives) after the Engagement
1									
2									
3									
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8									
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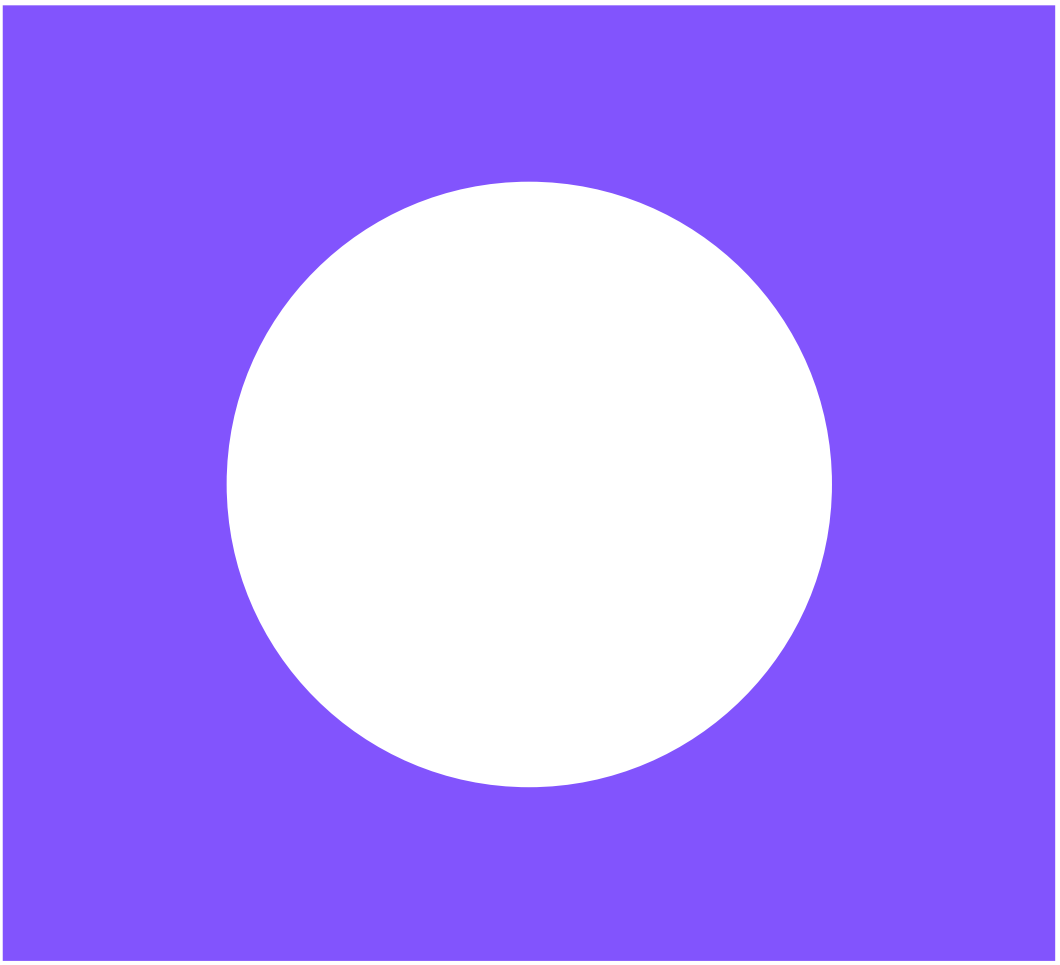
E. Sample Project Grievance Log

No	Name and surname of the stakeholder	Department / address information of the stakeholder	Stakeholder information (anonymous/not anonymous)	Stakeholder telephone number and/or email address	Stakeholder's request, suggestion, or grievance	Date of the stakeholder's request, suggestion, or grievance	Name/surname of the person receiving the request, suggestion, or grievance	Department of the person receiving the request, suggestion, or grievance	Date of notification of receipt of stakeholder's request, suggestion, or grievance (notification will be made within 3 working days)	Name/Surname of the person responsible for the action	Department of the person responsible for the action	Date of notification of the stakeholder about the result of the action taken (notification will be made within 30 working days)	Summary of action taken

F. ESIA Team

Name	Surname	Title
Bianca	Barsanoğulları	Environmental Consultant
Cevdet	Kabal	Senior Environmental Consultant
Doğukan	Turan	Assistant Environmental Consultant
Ece	Alper	Senior Social Consultant
Ece	Çataklı	Assistant Social Consultant
Enes	Körükoğlu	Assistant Environmental Consultant
Esra	Demirhan	Biodiversity Consultant
Evren	Kayaş	Social Consultant
Ezgi	Sert	Senior Environmental Consultant *Project Manager*
Gamze	Yıldırım	Environmental and Climate Change Consultant
Gizem	Arıkan Gürler	Senior Biodiversity Consultant
Melisa	Metin Turan	Biodiversity Consultant
Mustafa	İşlek	Principal Social Consultant
Neslihan	Ayvaz	Senior Associate Environmental Consultant *Project Director*